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Animate Creation,

a popular edition of the

STANDARD NATURAL HISTORY

OUR
Living
World.

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Animate Creation;

POPULAR EDITION OF

"OUR LIVING WORLD,"

A NATURAL HISTORY

BY

THE REV. J. G. WOOD.

REVISED AND ADAPTED TO

AMERICAN ZOOLOGY,

BY

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FULLY ILLUSTRATED WITH SCIENTIFIC ACCURACY.

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GRIZZLY AND BLACK BEAR.

AMERICA furnishes several species of the Bear tribe, two of which, the Grizzly Bear and the MUSQUAW, or BLACK BEAR, are the most conspicuous.

The Black Bear is found in many parts of Northern America, and was formerly seen in great plenty. But as the fur and the fat are articles of great commercial and social value, the hunters have exercised their craft with such determination that the Black Bears are sensibly diminishing in number. The chase of this Bear is an extremely dangerous one, and there are but very few Bear-hunters, however dexterous they may be, who do not in the end succumb to the claws and teeth of one of these powerful animals. Although it is naturally a very quiet and retiring creature, keeping itself aloof from mankind, and never venturing near his haunts except when incited by the pangs of fierce hunger, it is a truly furious beast when hemmed in by its antagonists, and all hope of escape cut off. Seated erect, with its eyeballs darting fury, its ears laid closely upon its head, its tongue lolling out of its mouth, and every gesture glowing with fierce energy, it presents a sight that is sufficient to unnerve any but an experienced hunter, who has learned by long practice to preserve a cool demeanor under the most exciting circumstances. Horses are almost useless at such a juncture, for unless they have been most carefully trained to the task, they are seized with such mental terror at the sight and scent of the infuriate animal that they give way to their frantic fears, and become wholly unmanageable by their rider. As the Bear stands, or rather sits at bay, it deals such terrible and rapid blows with its ready paws that it strikes down the attacking dogs as if they were so many rabbits, and ever and anon makes a furious charge at its enemies. Nothing but a rifle-ball seems to check the creature when it is wrought up to this pitch of fury, for even the severest wounds from a knife seem, unless they reach the heart, to have only the effect of exciting the animal to more furious rage.

As is the case with the Bears which have already been mentioned, the Black Bear is in the habit of passing the cold months of winter in some comfortable residence which it has prepared in the course of the summer. Practical hunters, however, remark that unless the Bear is exceedingly fat at the commencement of the cold season, it does not venture to betake itself to its winter home, but gets through the winter without hybernation. When they can be detected in their dens, the hybernating Bears are often so oppressed with irresistible sleep, that they can hardly be induced to move sufficiently to enable their discoverer to plant a fatal wound.

The fat of the Bear is, as is well known, considered as an infallible specific for increasing the growth of the hair and promoting its gloss, and is therefore a valuable article of commerce. The only portion of the fat that is legitimately employed for this purpose is the hard white fat which is found in the interior of the body. As might be expected from the enormous amount of titular "Bear's-grease" which is annually consumed, even in England, but a very small proportion of the substance which is called by that name has ever formed part of a Bear's person. The pig steps in to make good the deficiency, and the greater portion of the material which is sold under the name of Bear's-grease is in reality nothing more or less than hog's-lard, colored and scented in order to charm the eye and nostrils of the purchaser. The fur of the Black Bear is not so roughly shaggy as that of the European or the Syrian Bear, but is smooth and glossy in its appearance, so that it presents a very handsome aspect to the eye, while its texture is as thick and warm as that of its rougher furred relations.

This creature is but little given to animal food, and will restrict itself to a vegetable diet unless pressed by hunger. It is, however, very fond of the little snails which come up to feed on the sweet prairie-grass as soon as it is sufficiently moistened by showers or dew to suit the locomotive capabilities of those wet-loving mollusks, and is extremely fond of honey, in search of which dainty it displays great acuteness and perseverance.

Few trees afford so unstable a footing, that the Black Bear will not surmount them in order to reach a nest of wild bees, and there are few obstacles which his ready claws and teeth will not remove in order to enable him to reach the subjacent dainty. Even if the honey and comb be deeply concealed in the hollow of a tree, and the entrance by which the bees find ingress and egress to and from their habitation be too small for the insertion of a paw, the Bear will set steadily to work with his teeth, and deliberately gnaw his way through the solid wood until he has made a breach sufficiently wide to answer his purpose. When once he has succeeded in bringing the combs to light, he scrapes them together with his fore-paws, and devours comb, honey, and young, without troubling himself about the stings of the surviving bees.

MUSQUAW, OR AMERICAN BLACK BEAR.—*Ursus americanus.*

The hunters, who are equally fond of honey, find that if it is eaten in too great plenty it produces very unpleasant symptoms, which may be counteracted by mixing it with the oil which they extract from the fat of the Bear. This custom of eating mingled oil and honey affords a partial explanation of the prophecy, "Butter and honey shall he eat," which was necessarily put forth in language which was in accordance with the popular ideas of the period.

The flesh of the Bear is held in high esteem among the colonists and native hunters, and when properly prepared is considered a great delicacy by the denizens of civilized localities. The hams, when cured after the approved recipe, are greatly esteemed by epicures. The Brown Bear of Europe is also famed for the excellent quality of the meat which it furnishes.

The Black Bear is the most familiar species in America, being pretty well known in all portions. In the season, many of our city markets are provided with Bears' meat. It was once so common in New York that Bear Market was the name given to one place that made a specialty of the meat.

This Bear's *habitat* ranges from the northern portion of the Continent to Mexico. In California it is replaced by the Grizzly Bear.

The fat of the Bear is, as is well known, considered as an infallible specific for increasing the growth of the hair and promoting its gloss, and is therefore a valuable article of commerce. The only portion of the fat that is legitimately employed for this purpose is the hard white fat which is found in the interior of the body. As might be expected from the enormous amount of titular "Bear's grease" which is annually consumed, but a very small proportion of the substance which is called by that name has ever formed part of a Bear's person. The pig steps in to make good the deficiency, and the greater portion of the material which is sold under the name of Bear's grease, is in reality nothing more nor less than hog's lard, colored and scented in order to charm the eye and nostrils of the purchaser. There is yet another use to which the fat of the Bear is put, which will be presently mentioned.

The chase of the Musquaw, or Black Bear, is an extremely dangerous one, and there are but very few Bear-hunters, however dexterous they may be, who do not in the end succumb to the claws and teeth of one of these powerful animals. Although it is naturally a very quiet and retiring creature, keeping itself aloof from mankind, and never venturing near his haunts except when incited by the pangs of fierce hunger, it is a truly ferocious beast when hemmed in by its antagonists, and all hope of escape cut off. Seated erect, with its eyeballs darting fury, its ears laid closely upon its head, its tongue lolling out of its mouth, and every gesture glowing with fierce energy, it presents a sight that is sufficient to unnerve any but an experienced hunter, who has learned by long practice to preserve a cool demeanor under the most exciting circumstances. Horses are almost useless at such a juncture, for unless they have been most carefully trained to the task, they are seized with such mental terror at the sight and scent of the infuriate animal that they give way to their frantic fears, and become wholly unmanageable by their rider. As the Bear stands, or rather sits at bay, it deals such terrible and rapid blows with its ready paws that it strikes down the attacking dogs as if they were so many rabbits, and ever and anon makes a furious charge at its enemies. Nothing but a rifle-ball seems to check the creature when it is wrought up to this pitch of fury, for even the severest wounds from a knife seem, unless they reach the heart, to have only the effect of exciting the animal to more furious rage.

The Musquaw has a curious habit of treading frequently in the same path, so that after a little time it makes out for itself certain roads, which are easily detected by the practiced eye of the hunter, and often lead to the destruction of the animal which trod them.

During the month of June the Bears are very thin, and their flesh is considered to be of no value whatever; so that they enjoy a short period of unmolested ease. As they are especially fierce at this time of the year, the hunters have a double reason for keeping aloof from the animals which they persecute with a deadly pertinacity throughout the other portions of the year. Their peculiar ferocity at this time is attributable to the fact that the male Bears are engaged in seeking their mates, and when it happens, as is often the case, that two or more males take a fancy to the same female, they fight for the desired prize with unrelenting fury.

As is the case with the Bears which have already been mentioned, the Black Bear is in the habit of passing the cold months of winter in some comfortable residence which it has prepared in the course of the summer. Practical hunters, however, remark that unless the Bear is exceedingly fat at the commencement of the cold season, it does not venture to betake itself to its winter home, but gets through the winter without hybernation.

This species of Bear is remarkably prolific, the number of cubs which are produced at a birth being from one to four. When newly born they are very small, being only six or eight inches in length, and covered with gray hair. The month in which they make their entry into the world is either January or February, and they remain under strict maternal control until they are six months of age. For the first year of their existence the fur continues to retain the gray hue, but when they reach their second year the light-hued hair gives place to the glossy black coat which distinguishes the Musquaw. They shed their coat twice in the year:

namely, in spring and autumn; so that when the winter arrives, they are defended from its rigors by a new and warm covering of thickly planted hair. On account of this change in the color of the fur, the juvenile Musquaw has been considered as a separate species, and admitted into systematic catalogues under the name of Yellow, or Cinnamon Bear.

THERE are few animals which are so widely and deservedly dreaded as the GRIZZLY BEAR. This terrible animal is an inhabitant of many portions of Northern America, and is the acknowledged superior of every animal that ranges over the same country.

The other members of the ursine family are not given to attacking human beings, unless they are alarmed or wounded, but the Grizzly, or "Ephraim," as the creature is familiarly termed by the hunters, displays a most unpleasant readiness to assume the offensive as soon as it perceives a man, be he mounted or on foot, armed or otherwise.

GRIZZLY BEAR.—*Ursus ferox.*

Yet the Bear is not entirely without the innate dread of humanity which is instinctively implanted in every known animal, for, although it will attack a man without hesitation, it will not venture to follow up his track, and even if it should come across the air which is tainted by his presence, the Grizzly Bear will escape as fast as he can run. To this curious instinct the hunters have more than once owed their lives.

One man, who was engaged in duck-shooting, and whose gun was only loaded with shot, was suddenly alarmed at seeing a Grizzly Bear cantering towards him, having clearly already made up his mind to attack him. For the moment, the old man was in despair, but his presence of mind soon returned, and he made his escape in a very ingenious manner. Plucking some of the light fibres from his rough coat, he threw them in the air, in order to ascertain the direction of the wind, and then moved to one side, so as to cause the wind to blow from himself towards the advancing foe. As soon as the Bear perceived the strange scent, it stopped, sat upon its hind legs, wavered, and finally made off, leaving its intended prey master of the field.

If, however, the anger of this terrible animal should be aroused by the pain of a wound, it cares little for men or their scent, but rushes furiously upon them, dealing the most fearful blows with its huge paws, armed with their array of trenchant talons, and holding its powerful teeth in readiness for a close combat. So tenacious of life is the Grizzly Bear, that unless it receives a wound in the head or heart it will continue its furious struggles, even though it be riddled with bullets and its body pierced with many a gaping wound. These warlike capacities render the creature respected by the natives and colonists, and the slaughter of a Grizzly Bear in fair fight is considered an extremely high honor. Among the native tribes that dwell in the northern portions of America, the possession of a necklace formed from the claws of the Grizzly Bear is considered an enviable mark of distinction. No one is permitted to wear such an ornament unless the Bear had fallen under his hand; consequently, the value of the decoration is almost incalculable. So largely is this mark of distinction prized, that the Indian who has achieved such dignity can hardly be induced to part with his valued ornament by any remuneration that can be offered.

Mr. Palliser, who was fortunate enough to kill five of these terrible creatures, without suffering from their teeth or claws, bears ample testimony to the fury with which they make their assaults, and the need of a cool determination in the hunter who matches himself against such a foe. Just as the Bear approaches within a few yards of its adversary, it sits up on its hind legs for a moment, and then rushes forward with almost inconceivable velocity. But the moment when the Bear remains quiescent affords sufficient time for a determined hunter to take a steady aim, and to lodge a bullet in the heart or brain of the savage foe.

When the hunter is sufficiently confident in his powers of nerve to match himself against the Bear, he can generally come upon his game by searching among the lower lying grounds, which are filled with rugged timber and scrub fruit-trees.

It is generally supposed that the Grizzly Bear is unable to ascend trees, but it is now ascertained that the animal is quite an adept in tree-climbing, and makes use of the scandent art for the purpose of supplying itself with a bountiful and leisurely repast. As the Bear is very fond of acorns, and does not choose to gather them separately from the branches on which they grow, it ascends the trees, and with its powerful fore-limbs administers such severe blows and shakings to the boughs that the ripe acorns shower down like hail to the earth, whither the ingenious animal speedily descends in order to reap the benefit of its exertions. Yet it is frequently found that a man who has been chased by a Grizzly Bear has succeeded in saving his life by ascending a tree which the Bear has made repeated but ineffectual efforts to climb. The two accounts may be reconciled by the supposition that while the Bear is young, and comparatively agile in proportion to its weight, it is capable of ascending a perpendicular tree-trunk; but that when it becomes large and unwieldy, its limbs are not sufficiently powerful to raise so great a weight from the earth by so slight a hold as that which is afforded by the claws as they affix themselves to the rough bark.

The color of the Grizzly Bear is extremely variable, so much so, indeed, that some zoologists have suggested the existence of two distinct species. Sometimes the color of the fur is a dullish brown, plentifully flecked with grizzled hairs, and in other specimens the entire fur is of a beautiful steely gray. In every case, however these grizzled hairs are very conspicuous, so that there appears to be a certain tendency to whiteness in the surface of the fur. From this peculiarity, the specific title of "candescens," or whitish, has been affixed to the Grizzly Bear by Major Smith, and the creature has, in one or two hunters' narratives, been erroneously described as the White Bear.

The Grizzly Bear (*Ursus horribilis*), or *ferox*, as it has been called, is met with nearest east in the Missouri River region, above Fort Pierre, and is abundant on the Yellowstone. Along the Rocky Mountains and towards Mexico it finds its natural habitat. A variety having slight differences in color is found in Sonora, and the copper regions of New Mexico.

Mr. Bell, our venerable taxidermist, accompanied Audubon in his tour over the Rocky Mountain country. They encountered a Grizzly Bear on several occasions, when the creature quickly turned and tried to escape. These and other similar instances caused Mr. Audubon to believe that the Grizzly does not voluntarily attack man. Instances of savage encounter are always preceded by great provocation.

In its earlier years, the young Grizzly Bear may boast of a really beautiful fur, which, although very long, thick, and shaggy, is not of that coarse, wiry texture which is notable as belonging to the coat of the adult animal. The fur of the juvenile Bear is of a brown color, with a dark stripe along the spine, and is so enormously thick and long, that as the animal shuffles along, it shakes up and down with every step. The gait of this creature is rather peculiar, as it swings its body in a curious and exceedingly awkward manner, and rolls its head from side to side in unison with the movement of its body.

The fore-limbs of this animal are enormously powerful, and the feet of a full-grown adult are eighteen inches in length, and armed with claws of five inches long. These claws are extremely sharp, and when the animal delivers a blow with its paw, the sharp-edged talons cut the adversary's frame as if they were so many chisels. A singular peculiarity is found in these claws. The animal possesses the power of using them separately, and has been repeatedly seen to grasp a dry clod of earth in its foot, and to crumble it to pieces by the mere movement of the claws upon each other. The head is extremely large in proportion to the body, and the tail is so short that it is entirely hidden beneath the heavy fur that covers the hinder quarters. The native Indians are in the habit of amusing themselves with the perplexity of persons who are not aware of this circumstance, and whom they persuade that the carcase of a dead Grizzly Bear is easily lifted if seized by the tail,—a proceeding which bears a strong analogy to the method of capturing a bird by covering its tail with salt.

All animals stand in great fear of this formidable beast, and display the greatest terror even at the sight or the scent of a Bear-skin that has been stripped from the body. Even the powerful bison falls a victim to the Grizzly Bear, which has been seen to spring upon the foremost bull of a herd, dash it to the ground, and destroy it by a succession of tremendous blows with its armed paws. Another of these animals contrived to carry off a bison that had been shot by a hunter, and, after dragging it to some distance from the spot where it fell, to bury it in a pit which it had dug for the reception of its prey. It is said that the other predaceous animals hold the Grizzly Bear in such respect that they will not venture to touch a deer which has been killed by this powerful creature, and that the very imprint of the Bear's feet upon the soil is a warning which not even a hungry wolf will disregard.

As might be expected, this disinclination to meddle with the Grizzly Bear extends to the dead animal itself, and to its skin and carcass. One of these creatures had been shot, and its skin taken from the body, but as the hunter was not strong enough to carry the weighty hide, he was forced to leave it unguarded for fifteen hours, exposed to the attacks of the myriad nocturnal prowlers that swarm in those regions. Yet, when he came at daybreak next morning to secure his prize, he found that neither the skin nor the carcass had sustained the least damage from the teeth of the wolves, although any other animal would have been totally devoured in a very short time. Horses evince such terror at the sight and smell of the Grizzly Bear that they will not permit the skin to be laid on their backs until they have been carefully trained to the unwelcome task.

They are not very easily tamed, except when captured at an extremely early age; but even in that case, they are rather rough in their manners, and are but dangerous playfellows. They are extremely playful creatures when young, and are very amusing in their habits. One of these animals, which was captured by Mr. Palliser, behaved in a very amusing manner during the voyage homewards, and caused much mirth by its absurd pranks. "Indeed," as the writer observed, "the Bear proved to be the most entertaining member of the whole ship's company. He ate, drank, and played with the sailors, and proved such a source of amusement to them, that the captain, whom I have since had the pleasure of meeting, told me that he would gladly engage always to take a Bear with him when he went to sea in future."

On board of a passage-boat, a sudden shower of rain drove all the passengers, including the Bear, below deck, and Mr. Palliser's attention was roused by peals of laughter over the dining cabin. "On going above, to discover the cause of the merriment, I saw that the Bear was gone and his chain broken. The pilot, who had been relieved a few minutes before, now led me forward to inspect his caboose, which was surrounded by the passengers and deck hands, all in fits of laughter.

"I could not make out the reason of it at first, until one of the bystanders pulled a corner of the blanket of the pilot's bed, when, to my surprise, the jerk was answered by an indolent growl. My friend Bruin having got drenched by the shower, had broken his chain in disgust, and actually found his way to the pilot's bed, clambered into it, and rolled himself carefully between the blankets. The good-humored pilot was not in the least angry, but, on the contrary, highly amused, replying to my apologies as I kicked out his strange bed-fellow, 'Oh! never mind, mister; why, what's the hindrance to the blankets being dried again?'"

The same animal had contracted a strong friendship with a little antelope which was a fellow-voyager with himself; and on one occasion performed a most chivalrous service in behalf of its defenceless little friend.

As the antelope was being led through the streets, towards the vessel, a large mastiff flew at it, and was with difficulty kept at bay by the voice and stick of the person who was leading the terrified little creature. Mr. Palliser, who was following with the Bear, rushed to the rescue, but was outrun by the Bear, who dashed boldly forward and closed with the assailant in a moment. A fierce combat ensued, in which the Bear refrained at first from using his teeth or claws, and contented himself with seizing the mastiff in his powerful arms, and flinging him on his back with such violence that it rolled over and over on the ground. The dog, cheered by the voice of its master, succeeded at last in giving the Bear a tolerably sharp grip between its teeth. Incensed by the pain, Bruin lost his temper, and seizing the dog in his arms, squeezed the breath nearly out of its body, and was preparing to use its teeth, when the dog, which was rapidly choking under the terrible pressure of the Bear's arms, contrived to extricate itself by a sudden struggle, and ran away with piteous howls, leaving the Bear master of the field.

The length of a well-grown adult male is rather more than eight feet six inches, and the girth round the body is equal to the length. The weight of such an animal is rather more than eight hundred pounds. Specimens still larger are sometimes killed, but the average weight and dimensions are as given above.

The powerful claws of this animal are employed not only for combat, but in digging up the earth for various purposes, such as the search after various roots and bulbs, and the interment of some large animal which they have killed. The instinct for burying their prey is so largely developed in these creatures that they have more than once been deceived by the craft of a hunter, who, when resistance or escape was impracticable, has simulated death in order to disarm the wrath of the terrible animal. Thinking the man to be dead, and not being irritated by wounds, the Bear proceeds to scratch a pit in the earth, and to drag the unresisting prey into the hollow, and to cover him carefully with grass and leaves, pressing them well down, so as to conceal him effectually. Satisfied with its precaution, the Bear betakes itself to rest, and the buried hunter seizes the opportunity of slipping quietly away while the animal is engaged in repose.

Grizzly Bears kept in captivity have always attracted great attention by their amusing and playful habits. Two of these underwent once a surgical operation, while under the influence of chloroform. Bears are subject to ophthalmia, especially when in confinement, and are often totally deprived of sight by this disease. Until the discovery of the anæsthetic powers of chloroform, the poor animals were doomed to hopeless blindness, but at the present day the Bear is rendered as quiet and harmless as a guinea-pig under the influence of this potent vapor.

In order to place the sponge that contained the chloroform fairly under the animal's nostrils, it was necessary to bring its head close to the bars of the cage, an operation which was with difficulty effected by the united efforts of four strong men. The sponge was then affixed to its snout, and in a very short time the animal was lying on the floor of its cage, without sense or motion. The door was then opened, and the Bear's head being laid on a plank outside the cage, the operator speedily removed the obstacle. The animal was then replaced in the cage, where it lay for five or six minutes without motion, and at last contrived to get on its legs, and walk very unsteadily into its den. The next morning saw the Bear sitting at its ease, restored to sight, and feeling no apparent inconvenience from the contrast between the morning's light and the thick dullness that had for so long a time oppressed its vision.

THE THIBETIAN SUN-BEAR is an example of a group of Bears which have received the title of Sun-Bears, from their habit of basking in the rays of the burning sun, instead of withdrawing to their dens, as is the custom with the generality of Bears, as long as the sun pours its meridian beams on the earth. The name Helarctos, by which the genus is designated, is composed of two Greek words, the former signifying the sun, and the latter a Bear.

The country in which the Thibetian Bear resides is manifest by its name. It has also been discovered in the Nepaul range of mountains. The fur of this creature is tolerably thick and smooth, and is generally of a black color, with the exception of the lower lip and a large patch of white hairs on the breast, which is narrow at the lower part, and, widening as it approaches the chin, separates into two short horns, which partially extend towards the shoulders. The entire spot bears, therefore, some resemblance to the letter Y rather imperfectly delineated, and with its upright stem rather shortened.

The body of the Thibetian Bear is heavily, but strongly made, and the limbs seem to be rather less agile than those of the American or Scandinavian Bears. The claws are not so powerful as those of the generality of Bears, the ears are comparatively large, and the neck is peculiarly thick. It seems chiefly to rely for its subsistence on fruit, roots, and various vegetable productions. It is not quite so large as the Bears which have already been mentioned.

A VERY curious example of the Sun-Bears is found in the species which is known by the name of the BRUANG, or MALAYAN SUN-BEAR, and has been rendered famous by the spirited description of its appearance and habits which has been given by Sir Stamford Raffles.

The fur of this animal is particularly fine and glossy, and the hair is shorter than in the generality of the Bear tribe. The color of its fur is a very deep black, with the exception of a large semi-lunar shaped patch of white on the breast, and a yellowish-white patch on the snout and upper jaw, which afford a striking and curious contrast to the uniformly black color of the fur. The lips and tongue of this Bear are extremely flexible, and are capable of being prolonged to an almost incredible extent. It is supposed that the great length of its tongue, and the exceedingly flexible power of that organ, are intended for the purpose of enabling the animal to obtain the honey from the nest of the wild bee, by insinuating its lithe tongue into the apertures of the hive, and licking the sweet food from the waxen treasuries.

The head of the Bruang is rather thick, and the neck is singularly powerful in comparison with the size of the head. The eyes are very small, and the iris is of a rather pale lilac color, and tolerably lively in its appearance. It is not a large animal, measuring when adult only four feet six inches in length, but it is extremely powerful in proportion to its size, being able to grasp and tear from the ground the strongly-rooted plantains of Borneo, which are so large that the Bear is hardly able to embrace them in its grasp. The claws of the Bruang are extremely long.

When in its wild state, it is almost entirely a vegetable eater, preferring fruit before most articles of diet, and making great havoc among the tender shoots of the cocoa-nut trees. In some parts of Sumatra, where the villages have been deserted, the cocoa-nut groves have been entirely destroyed by the insatiate appetite of the Bruang.

As it is easily tamed, it is frequently seen in a state of domestication, and is a very amusing and gentle creature, associating freely with children, and earning by its uniformly quiet conduct the privilege of unrestricted liberty. Sir Stamford Raffles, who possessed one of these Bears, permitted it to live in the nursery, and never was obliged to chain, chastise, or otherwise punish the good-tempered animal. Being something of an epicure, and often admitted to his master's table, the Bruang would refuse to eat any fruit except mongosteens, or to drink any wine except champagne. It may seem remarkable that a Bear should display any predilection for fermented liquids, and more so that it should be so fastidious as to select champagne as the wine which it honored with its preference. Such, however, was the case, and the animal was so fondly attached to the champagne-bottle, that the absence of his favorite liquid was the only circumstance that would make him lose his temper. His affectionate disposition led him to extend his friendship to various of his acquaintances, and he was on such excellent terms with the entire household, that he would meet on equal footing the cat, the dog, and a small Lory, or Blue-mountain bird, and amicably feed with them from the same dish.

One of these Bears that was successfully domesticated was able to eat animal as well as vegetable food, but was fed exclusively on bread and milk, of which it consumed rather more than ten pounds per diem. It is possessed of much flexibility of body, and is very fond of sitting on its hind legs, thrusting out its long tongue to an extraordinary distance, and ever and anon withdrawing it into the mouth with a peculiar snapping sound. While thus engaged, it makes the most grotesque and singular gestures with the fore-limbs, and rolls its body from side to side with unceasing assiduity. It seldom remains in one position for any length of time, and, although its movements are not characterized by much energy or rapidity, it is evidently possessed of much power over its limbs, and if it were disposed to enter into strife would probably use its long talons to good purpose.

BRUANG, OR MALAYAN SUN-BEAR.—*Helarctos malayanus.*

Resembling the Malayan Bruang in general habits and disposition, the Bornean Bruang, or Sun-Bear, is acknowledged to belong to a different species from the animal which has just been described. The color of its fur is nearly as black as that of the Bruang; but the patch upon its breast is of an orange hue, instead of the grayish white which is so conspicuous in the Malayan Bruang.

Like that animal, it can sit or stand on its hinder limbs with the greatest ease, and possesses nearly as much flexile power of lip and tongue as the Bruang. It has a curious habit of placing its superabundant food upon its hinder paws, as if to guard it from the defilement of sand or dust, and feeds itself by slow degrees with dainty carefulness.

It is extremely fond of fruits and various vegetables, and is, in its native country, a dreaded foe to the cocoa-nut trees and their fruit. The animal is so excellent a climber that it cannot be baffled by loftiness of trunk or smoothness of bark; and when the creature has attained the summit of the tree it frequently destroys the life of the tree by devouring the topmost shoot for the sake of its delicate succulence. The cocoa-nuts themselves are objects of interest to the Bornean Bruang, who is extremely fond of the peculiarly-flavored liquid that is found in the interior of the nut; and when he has reached a cluster of ripe nuts will tear them from the tree and fling them on the ground.

In captivity it is gentle, playful, and amusing, and possesses very curious and almost ludicrous habits, which render it an object of interest to its visitors. Profoundly sensible of human sympathies, and almost as fond of notice as a cat, the Bornean Bruang will accept with evident delight the caresses of its visitors, and is pleased to be patted or stroked by kindly hands, provided that it does not happen to be in a bad humor at the time. Should the animal consider itself to be insulted—a matter of rather frequent occurrence—it will contumeliously reject all advances, and will not consent to receive any mark of attention until the offender is fairly out of sight.

Unwieldy in its movements, and grotesque in its form, the Aswail, or Sloth Bear, is one of the most curious members of this group of animals. It is found in the mountainous parts of India, and is equally dreaded and admired by the natives of the same country.

Although a sufficiently harmless creature if permitted to roam unmolested among its congenial scenery of mountain and precipice, it is at the same time an extremely dangerous foe if its slumbering passions are aroused by wounds or bodily pain of any kind. It needs, however, that the wound be tolerably severe to induce the animal to turn upon the person that inflicted the injury; for should it only be slightly wounded, it runs forward in a straight line, as if it were actuated by the one idea of getting as far as possible away from the object which had caused it so much bodily suffering, and can but seldom be finally captured.

As a general rule, the Aswail remains within its sheltered den during the hot hours of the day, as its feet seem to be extremely sensitive to heat, and suffer greatly from the bare rocks and stones which have been subjected to the burning rays of that glowing Indian sun. On one or two occasions, however, where the wounded Bear had been successfully tracked and killed, the soles of the poor animal's feet were found to be horribly scorched and blistered by the effects of the heated rocks over which the creature had recklessly passed in its haste to escape from its enemies.

On account of this extreme sensitiveness of the Aswail's foot, it is very seldom seen by daylight, and is generally captured and killed by hunters who track it to its sleeping-place, and then attack their drowsy prey.

The Aswail is said never to eat vertebrate animals except on very rare occasions, when it is severely pressed by hunger. Its usual diet consists of various roots, bees' nests, together with their honey and young bees, grubs, snails, slugs, and ants, of which insects it is extremely fond, and which it eats in very great numbers.

Probably on account of its mode of feeding, its flesh is in much favor as an article of diet, and though rather coarse in texture, is said by those who have had practical experience of its qualities to be extremely good.

The fat of this Bear is very highly valued among the natives and the European residents, being used chiefly for the lubrication of the delicate steel work that is employed in the interior of gun-locks. For this purpose the fat is prepared in a similar manner to that of the tiger, being cut into long strips, forced into closely stoppered bottles, and placed during the entire day in the blazing rays of the sun. The powerful sunbeams soon melt the fat into a homogeneous mass, and when the evening begins to draw on, the contents of the bottle are found to settle into a firm and white substance, which has the property of remaining untainted even in that heated climate, where, if no such precaution were taken, it would in a very few hours become a mass of putrescent abomination. The prepared fat is especially valuable for gun-locks, as it preserves the bright steel from rust, and does not clog with constant service, as is the case with almost every other animal oil.

In connection with this subject it may be as well to mention that the ordinary "trotter oil," or "neats'-foot oil," may be prepared for the most delicate work in a similar manner. If a bottle of this oil be placed in the sun's rays, and a few strips of lead dropped into the vessel, an extraordinarily heavy deposit begins to take place, and fills the lower part of the bottle. The upper part, however, remains bright and limpid as crystal, and by a repetition of the same process may be so effectually purified that it will never be liable to that annoying viscidity which detracts so much from the value of animal oils that have been for some time in use. It is in this manner that watch makers purify the oil for the lubrication of the delicate machinery of their trade.

Very little is known of the habits of this Bear while in its wild state, but it would appear from the conduct of two young animals that inhabited the same cage in the Zoological Gardens, that it must be a gentle and affectionate creature.

It is, at all events, known that the maternal Aswail is in the habit of carrying on her back those of her offspring that are not able to make full use of their own means of progression.

The two animals that were kept in the Zoological Gardens were accustomed to lie close to each other, and while in that easy position used to suck their paws after the usual ursine fashion, uttering at the same time a kind of bearish purr, as an expression of contentment. This sound, although it partakes of the nature of a whine, admixed with the purr, is not without a musical intonation, and may be heard at some little distance. Indeed, it has not unfrequently happened that the Bear has been betrayed to its pursuers by the continuous sound which it utters while lying half asleep within its den.

The hair which covers the body and limbs is of singular length, especially upon the back of the neck and the head, imparting a strange and grotesque appearance to the animal. The color of the fur is of a deep black, interspersed here and there with hairs of a brownish hue. Upon the breast, a forked patch of whitish hairs is distinctly visible. When it walks, its fore-feet cross over each other, like those of an accomplished skater when accomplishing the "cross-roll," but when it remains in a standing attitude its feet are planted at some distance from each other.

These Bears seem to be very liable to the loss of their incisor teeth, and even in the skulls of very young animals the teeth have been so long missing that their sockets have been filled up by nature as if no teeth had ever grown there. On account of this curious deficiency, a captured specimen was thought to be a gigantic sloth, and was classed among those animals under the name of *Bradypus ursinus*, or Ursine Sloth. In one work it was candidly described as the Anonymous Animal. Other names by which it is known are the Jungle Bear, and the Labiated or Lipped Bear.

This last-mentioned title has been given to the animal in consequence of the extreme mobility of its long and flexible lips, which it can protrude or retract in a very singular manner, and with which it contorts its countenance into the strangest imaginable grimaces, especially when excited by the exhibition of a piece of bun, an apple, or other similar dainty. It is fond of sitting in a semi-erect position, and of twisting its nose and lips about in a peculiarly rapid manner, in order to attract the attention of the bystanders, and ever and anon, when it fails to attract the eyes of its visitors, it slaps the lips smartly together in hopes to strike their sense of hearing.

When captured young, it is easily tamed, and can be taught to perform many curious antics at the bid of its master. For this purpose it is often caught by the native mountebanks, who earn an easy subsistence by leading their shaggy pupil through the country, and demanding small sums of money for the exhibition of its qualities. On account of its association with these wandering exhibitors, it has been called by the French naturalists "Ours Jongleur." Whether owing to the natural docility of the animal, or to the superior powers of its instructor, it performs feats which are more curious and remarkable than the ordinary run of performances that are achieved by the Learned Bears of our streets.

In either case, it is always a saddening sight, for, however ingenious may be the instructor, or however docile the pupil, the unnatural performances of the poor animal always seem to be out of place. We have no right to attempt to humanize a Bear or any other animal; for in so doing we are preventing it from working the task which it was placed in the world to fulfil.

The Bear—as may be said of every animal—is the result of a divine idea in the mind of the Creator, and it ought to be our business to aid the creature in developing that idea as far as possible, and not to check its development by substituting some other idea of our own, which, with all we can do, must necessarily be a false one. Even the imprisoned Bears which mount a tall pole for the purpose of obtaining cakes and fruits from their visitors, are performing their mission much more truly than the most accomplished Bear that ever traversed the country, and are, in consequence, much more agreeable to the eye of any one who values the animal creation on account of the moral qualities which are implanted in them from their birth, for us to develop to their highest extent, and in which we may read an ever-living word proceeding from the ever-creating hand of God.

Moreover, all those who in studying natural history desire to look deeper than the surface, and to direct their attention rather to the inward being of the various animals than to their outward forms, will find that every creature in which is the breath of life has a physical, a moral, and sometimes a spiritual analogy with the more expanded organisms of humanity, and owes its position among created beings to that very analogy.

In every human being are comprised all the mental characteristics that are outwardly embodied in the various members of the animal kingdom, and it is impossible to mark any attribute of the lower animals which does not find a further and a higher development in the human existence in one or other of its manifestations.

This subject is too wide to receive even a cursory notice in the present article, but will be again taken up on future pages.

THERE is generally an aquatic member of each group of animals throughout the vertebrate kingdom, and among the Bears this part is filled by the NENNOOK, or POLAR BEAR, sometimes called, on account of its beautifully silvery fur, the WHITE BEAR. As has already been mentioned, the Bears are good swimmers, and are able to cross channels of considerable width, but we have, in the person of the Nennook, an animal that is especially formed for traversing the waters and for passing its existence among the ice mountains of the northern regions.

Probably in consequence of the extreme cold which prevails in the high latitudes where this creature is found, its food is almost entirely of an animal nature, and consists of seals and fish of various kinds. In order to capture the fish in their own element, or to make prey of the active and wary seals, it is necessary that the Nennook should be endowed with no ordinary powers of body and sense. Its capabilities of scent are extraordinarily fine, for it will perceive, by the exercise of that sense alone, the little breathing-holes which the seals have made through the ice, even though the icy plain and the breathing-holes are covered with a uniform coating of snow. Even the Esquimaux dog, which is specially trained for this very purpose, is sometimes baffled by the extreme difficulty of discovering so small an aperture under such difficult circumstances.

So active is this Bear, and so admirable are its powers of aquatic locomotion, that it has been seen to plunge into the water in chase of a salmon, and to return to the surface with the captured fish in its mouth. And when it is engaged in the pursuit of seals, as they are lying sleeping on a rock or an ice-raft, it is said to employ a very ingenious mode of approach. Marking the position in which its intended prey lies, it quietly slips into the water, and diving

POLAR BEAR.

below the surface, swims in the intended direction, until it is forced to return to the surface in order to breathe. As soon as it has filled its lungs with fresh air, it again submerges itself, and resumes its course, timing its submarine journeys so well, that when it ascends to the surface for the last time it is in close proximity to the slumbering seal. The fate of the unfortunate victim is now settled, for it cannot take refuge in the water without falling into the clutches of its pursuer, and if it endeavors to escape by land it is speedily overtaken and destroyed by the swift-footed Bear.

The endurance of the Bear while engaged in swimming is very great, for it has been seen swimming steadily across a strait of some forty miles in width. Even the large and powerful walrus is said to fall a victim to the superior prowess of the Polar Bear. Although its appetite is of so decidedly carnivorous a nature in the northern regions, it assumes a milder character in southern climes, and contents itself with vegetable aliment. In England, it has been fed for a considerable time on bread alone, of which it consumes about six pounds per diem, and its fondness for cakes and buns is well known to every frequenter of the Zoological Gardens. Even in its wild state, it is in the habit of varying its food by sundry roots and berries, and is often found engaged in searching for these dainties at some distance from the sea-shore.

So powerful an animal as the Polar Bear must necessarily be very dangerous when considered in the light of a foe, and as it is rather tetchy and very uncertain in its temper, it often affords ample scope by which its pursuers may test their prowess. Sometimes it runs away as soon as it sees or smells a human being, but at others it is extremely malicious, and will attack a man without any apparent reason. As is the case with nearly all the Bears, it is very tenacious of life, and even when pierced with many wounds will fight in the most desperate manner, employing both teeth and claws in the combat, and only yielding the struggle with its life.

The color of the Nennook's fur is a silvery white, tinged with a slight yellow hue, rather variable in different individuals. Even in the specimens that were confined in the Zoological Gardens there was a perceptible difference in the tint of their fur, the coat of one of them being of a purer white than that of the other. The yellowish tinge which has been just mentioned is very similar to the creamy-yellow hue which edges the ermine's fur. The feet are armed with strong claws of no very great length, and but slightly curved. Their color is black, so that they form a very bold contrast with the white fur that falls over the feet. Even at a considerable distance, and by means of its mere outline, the Polar Bear may be distinguished from every other member of the Bear tribe by its peculiar shape. The neck is, although extremely powerful, very long in proportion to the remainder of the body, and the head is so small and sharp that there is a very snake-like aspect about that portion of the animal's persons.

The shape of the head is rather remarkable, for whereas in the Brown and other Bears the muzzle is separated from the forehead by a well-marked depression, in the Polar Bear the line from the forehead to the nose is almost continuous. The foot of the Nennook is of surprising comparative length, for it is equivalent in length to one-sixth of the entire length of the body, whereas in the Brown Bear it is but one-tenth of that measurement. The sole of the foot is covered with a thick coating of warm fur, which is in all probability intended for the double purpose of protecting the extremities from the intense cold of the substance which it is formed to traverse, and of enabling the creature to tread firmly on the hard and slippery ice.

From these and other peculiarities of form it is now acknowledged as a separate species of Bear, and even removed into a different genus by many naturalists, although the earlier writers on this subject supposed that it was merely a permanent variety of the Brown Bear, which had obtained a white coat by constant exposure to the terrible cold of these wintry regions, and whose form had been slightly modified by the ever-repeated habits of its strange life.

Although so powerful an animal, and furnished by nature with such dreadful arms of offence, it is considered by the experienced Bear-hunters of Norway to be inferior in combat to the common Brown Bear, and is less dreaded by them as an antagonist.

Its powers of endurance are necessarily great, for its means of subsistence are always precarious, and in many cases are extremely small indeed. As the Bear is in the habit of passing so much time upon the ice, and generally devours upon its frozen surface the prey which has been captured, it is liable to be affected by the sudden and extraordinary changes that are constantly taking place in the vast ice-fields of these cold regions. Pieces of ice on which the Bears are quietly sleeping after their repast, become noiselessly dissevered from the main body, and are carried off to sea for a very great distance before the Bear is aware of its enforced voyage. Scoresby records such an instance, where he met with a Polar Bear upon a piece of drift ice that was floating at sea some two hundred miles distant from the land. As the ice nourishes no animals that could afford nutriment to the white-coated resident, the Bear is forced to depend for its entire subsistence upon the fish that it may be able to capture. Out at sea, however, the fishy tribe are not so easily procured as near the shore, and the hunger-endurent powers of the Bear are thoroughly tested before it can again place its shaggy foot on the welcome soil.

Owing to these marine excursions the Polar Bear is forced to pay unwilling visits to civilized shores which it loves not, and where it is obliged to fall upon the sheep and cattle of the residents in order to appease its hunger. The ire of the owners is greatly excited by the loss of their cattle, and the unfortunate Bear—a thief in spite of itself—is soon destroyed by the bereaved proprietors. Sometimes a whole party of Polar Bears is thus carried off, and for a while they inflict infinite damage on the country where they land.

As the Nennook passes its life among the wintry regions of the north, its hybernation has been often discredited, and it has been said to make a partial migration southwards, so soon as the terrible frosts of the Arctic winter close up the pools whereto the seals and other animals which constitute its prey are in the habit of resorting. Other writers, again, assert that the Polar Bear ceases feeding in the winter, as do the other members of the same group, and that the young Nennooks are produced while the mother is safely housed in her den. There is a truth in both these opinions, for it is now ascertained that the female Polar Bear is in the habit of hybernating, but the male Nennook passes his winter in the active exercise of his faculties.

The winter home of the Polar Bear is always made in some sheltered situation, such as the cleft of a rock, or the foot of a precipitous bank. In a very short time after the animal has taken up her residence in her new abode, she is effectually concealed from observation by the heavy snow-drifts, which cover the whole country with such strangely-shaped hills and valleys that the Bear's den is entirely undiscoverable by the eye. Sometimes the Bear will wait until a heavy fall of snow has taken place, and then will dig away the snow so as to form a cavern of the requisite size. In all cases, the snow appears to be a necessary element in the well-being of the animal during its long winter's repose. If the female Bear should not be about to take upon herself the cares of maternity, she does not think herself bound to lie hidden during the winter, but traverses the ice-fields together with the male, and becomes very fat during the cold months of the year. These nomad individuals do not confine their peregrinations to the sea-shore, but extend their journeys inland to a considerable distance, being sometimes found as far as thirty miles from the sea-coast.

The young of the Nennook are generally two in number; and when they make their first appearance outside the snow-built nursery in which their few months of existence have been passed, are about the size of shepherds' dogs, and in excellent condition. Their mother, however, is sadly reduced by her long fast and the calls which have been made upon her by her offspring; so that she re-enters the world in a very poor condition of aspect and temper, as might be expected of so ravenous and hungry an animal. Watchful over the safety of her cubs, and unburdened by any superfluous flesh, she is a very dangerous personage to be casually met with; for she is so savage with hunger that her temper is in a constant state of irritation; and she is so jealous of the safety of her offspring that she suspects every moving object to be an enemy.

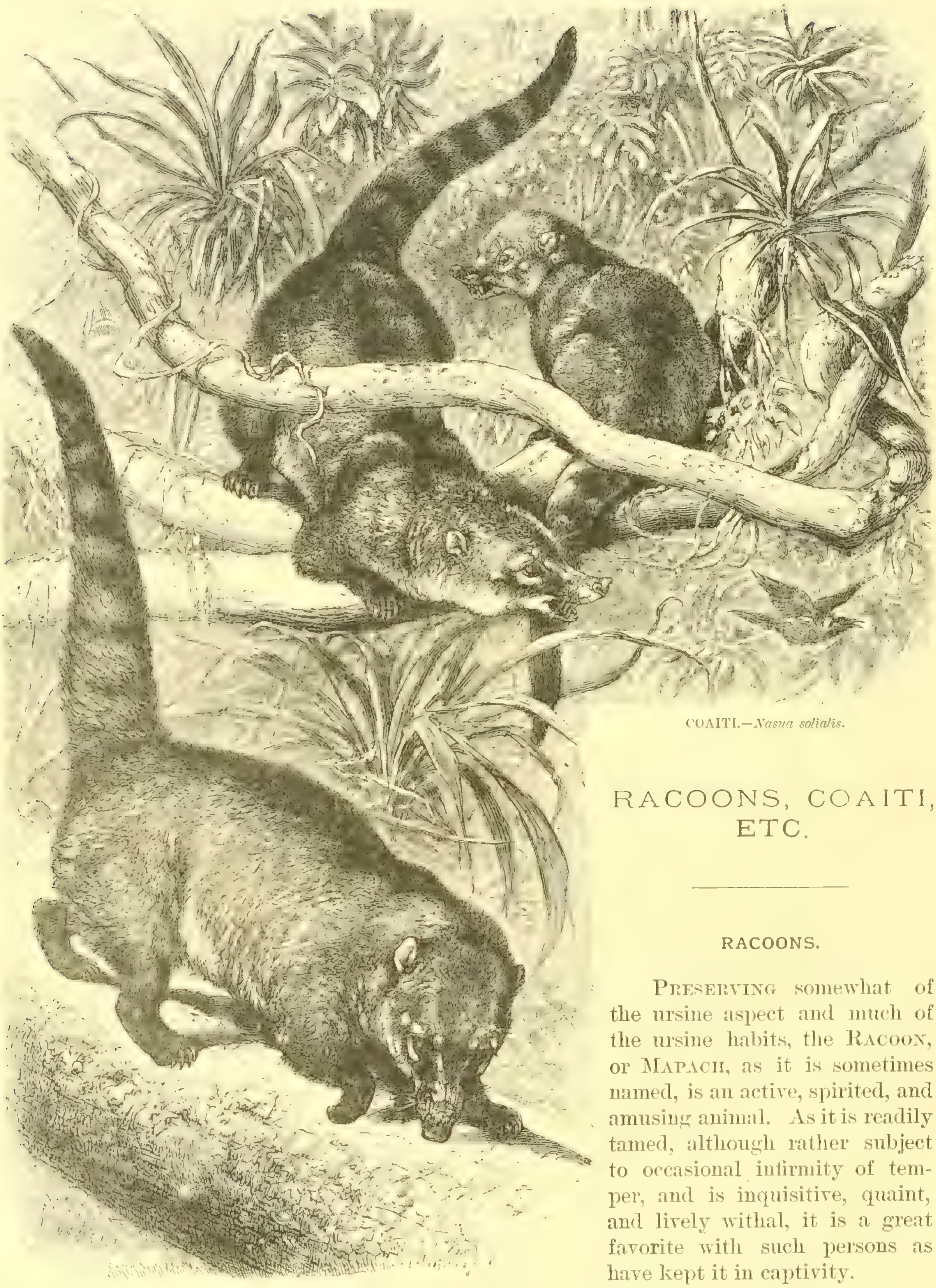
The flesh of the Polar Bear is eatable, and is highly esteemed by the Arctic voyagers, who eagerly welcome a supply of fresh and wholesome meat such as is furnished by the animal in question. It is said, however, that the liver ought to be avoided as an article of diet, as it is apt to cause painful and even dangerous symptoms to those who have partaken of it. Yet the liver of the American Black Bear is said to be a peculiar luxury when dressed on skewers, kabob fashion, with alternate slices of fat.

The Polar Bear is emphatically a marine animal, though not so in the sense of a whale, or like forms. The aspect of the White Bear is unmistakable.

The Spectacled Bear (*Ursus ornatus*) is the only species found in South America, where it ranges over the Cordilleras. It is black, with the exception of two semicircular yellow marks above the eyes, which suggest the trivial name.

It will be observed, after the perusal of the foregoing pages, that the Bears are found in almost every part of the world, with two notable exceptions, viz., Africa and Australia. With regard to the latter of these countries, it may be remembered that the entire creation, whether animal or vegetable, is of so strange a nature that it cannot be subjected to the rules which govern the rest of the world. There is, it is true, a tree-climbing creature in Australia, of a somewhat clumsy and ursine aspect, which is popularly called the Australian Bear, but which is in reality no Bear at all, but a member of the curious family of the Macropidæ, which contains the kangaroos, bandicoots, and opossums, and will be shortly described in its proper place under the title of the Kaola. With regard to the African continent, the existence or non-existence of Bears is by no means decided.

Many of the ancient historians make constant mention of African Bears. Juvenal, for instance, speaks of Numidian Bears, Virgil and Martial of Libyan Bears, while it is recorded in the annals of the Roman empire, that in the year B. C. 61, a hundred Numidian Bears were exhibited in the circus, each Bear led by a negro-hunter. None, however, of the later African travellers have clearly seen Bears in that country, and it is certain that from the days of Pliny up to the present time no true Bears have been found in Africa. Still, it is very possible that these animals may be yet discovered in that vast continent; for there seems to be no reason why Bears should be unable to exist in some parts of so large a country, although they might not be able to find subsistence in those portions which have already been investigated.



COAITI.—*Nasua solialis.*

RACOONS, COAITI, ETC.

RACOONS.

PRESERVING somewhat of the ursine aspect and much of the ursine habits, the RACOON, or MAPACH, as it is sometimes named, is an active, spirited, and amusing animal. As it is readily tamed, although rather subject to occasional infirmity of temper, and is inquisitive, quaint, and lively withal, it is a great favorite with such persons as have kept it in captivity.

The color of this animal is rather peculiar, and not very easy to describe.

The general tint of the body and limbs is an undecided blackish gray, the gray and black predominating according to the position of the observer and the arrangement of the fur. The hairs that form the coat of the Racoon are of two kinds, the one of a soft and woolly character, lying next to the skin, and the other composed of long and rather stiff hairs that project through the wool for some distance. The woolly fur is of a uniform gray, while the longer hairs are alternately marked with black and grayish white. Upon the top of the head and across the eyes the fur is of a very dark blackish brown; and upon the knee-joint of each leg the fur is of a darker tint than on the rest of the body. The tail is rather short and bushy in character, and is marked with five, or sometimes six blackish rings upon a ground of dark gray. In the British Museum is preserved a specimen of the Racoon, which is entirely white, its fur being of as pure a whiteness as that of the ermine itself.

In its gait and general carriage is visible an admixture of the plantigrade with the digitigrade; for when it stands or sits it plants the entire sole of its foot upon the ground, but when it runs in haste it only touches the earth with the tips of its toes. Generally, it is nocturnal in its habits, passing the whole of the daytime in sleep, snugly curled up in the warm blanket of its own rich fur, and slumbering heavily with its head sunk between its hinder limbs.

RACOON.—*Procyon lotor.*

As is indicated by the peculiar nature of its teeth, the Racoon is capable of feeding on animal or vegetable food, but seems to prefer the latter. Indeed, there seem to be few things which the Racoon will not eat. One of these animals ate a piece of cedar pencil which it snatched out of my hand, and tried very hard to eat the envelope of a letter on which I was making notes. Not succeeding in the attempt, it consoled itself by tearing the paper into minute morsels, employing teeth and paws in the attempt. It did its best to get a ring off my finger, by hitching one of its crooked claws into the ring and pulling with all its strength, which was very considerable in proportion to the size of the animal. Its brown eyes lighted up with animation when engaged in play, and it was very fond of pushing its paw through the bars of its cage, in order to attract attention.

A Racoon that was kept in a barrack-yard in Canada, in company with a bear, an owl, and various finned and feathered creatures, was considered to be the most interesting of all the little menagerie. It was extremely tame, but could not be trusted near poultry, as it had a bad habit of pouncing suddenly upon them, grasping them in its hand-like paws, and biting off their heads in a moment. It would then devour the head and afterwards the body in a leisurely manner. There were many bats in the neighborhood, and the soldiers were in the habit of capturing those nocturnal depredators, and throwing them on the ground within reach of the Racoon's chain. Before the bat could flap its wings, the Racoon would leap upon it, roll it rapidly in its paws for a while, and then despatch it with a single bite.

It was rather a vengeful animal, and possessed of a tenacious memory for an insult. The great owl that was partaker of the same residence had one day been irritated with the Racoon and had pecked it on the back. The Racoon treasured the insult in its heart, and waited a favorable time for revenge. The opportunity was not long delayed, for on the first occasion that the owl ventured within reach of the Racoon's chain, the aggrieved animal crept slyly towards its foe, and adroitly snatched out all the feathers of the owl's tail.

In its native state it is a great devourer of oysters, crabs, and other similar animals, displaying singular ingenuity in opening the stubborn shells of the oysters, or in despatching the crabs without suffering from their ready claws. Sometimes it is said to fall a victim to the oyster, and to be held so firmly by the closing shells that it cannot extricate itself, and perishes miserably by the rising tide. Its oyster-eating propensities have been questioned, but are now clearly proven. The sand and soil that fringe the oyster-beds are frequently seen to be covered with the footmarks of this animal.

It is always fond of water, drinking largely, and immersing its food, so as to moisten it as much as possible. When engaged in this curious custom it grasps the food in both its fore-paws, and shakes it violently backward and forward in the water. On account of this remarkable habit it has been dignified with the title of Lotor, a washer. The German naturalists term it Wasch-Bär, or Washing Bear. In captivity it is anything but abstemious, and rejects plain water, provided that it can be furnished with fermented liquids, strong and sweet. Referring to this propensity, Lawson, who was Surveyor-General of Carolina in the year 1714, says of the Racoon that, "if taken young, it is easily made tame, but is the drunkenest creature living if he can get any liquor that is sweet and strong." He furthermore relates that this animal is in the habit of catching crabs by putting its foot into their holes, and dragging out the crab as soon as it seizes the intruding limb.

Roving at night through the woods, and being gifted with singular subtlety as well as agility, it is frequently chased by the residents, who think a 'Coon hunt to be one of the most exciting of sports. Certainly, to judge from the animated descriptions of such scenes, the whole affair must be marvellously picturesque to the eye as well as exciting to the mind. The usual plan of hunting the 'Coon, is to set an experienced dog on its trail, and to chase it until it takes refuge in a tree. A blazing fire of pine-chips is then built under the tree, which illuminates its branches and renders the smallest leaf perceptible. A good climber then ascends the tree, and speedily dislodges the concealed animal. Audubon gives a very lively account of a Racoon hunt, ending as follows:—

> "Off we start again. The boys had got up with the dogs, which were baying at a Racoon in a small puddle. We soon joined them with a light. 'Now, stranger! watch and see!' The Racoon was all but swimming, and yet had hold of the bottom of the pool with his feet. The glare of the lighted torch was doubtless distressing to him; his coat was ruffled, and his rounded tail seemed thrice its ordinary size, his eyes shone like emeralds; with foaming jaws he watched the dogs, ready to seize each by the snout if it came within reach. They kept him busy for several minutes; the water became thick with mud; his coat now hung dripping and his draggled tail lay floating on the surface. His guttural growlings, in place of intimidating his assailants, excited them the more; and they very unceremoniously closed upon him, curs as they were, and without the breeding of gentle dogs. One seized him by the rump, and tugged, but was soon forced to let go; another stuck to his side, but soon taking a better directed bite of his muzzle than another dog had just of his tail, 'Coon made him yelp; and pitiful were the cries of luckless tyke.
>
> "The Racoon would not let go, but in the meantime the other dogs seized him fast, and worried him to death, yet to the last he held by his antagonist's snout. Knocked on the head by an axe, he lay gasping his last breath, and the heaving of his chest was painful to see. The hunters stood gazing at him in the pool, while all around was by the flare of the torch rendered trebly dark and dismal. It was a good scene for a skillful painter."

In size, the Racoon equals a small fox, to which animal it bears a slight external resemblance. The number of its young is usually two or three, and they make their appearance in the month of May.

The Agouara, or Crab-eating Racoon, is a native of a warmer portion of America than the common Racoon, and has derived its name of Crab-eater from its habit of feeding on all kinds of crustaceas and mollusks, whether marine or terrestrial, although perhaps it is not more addicted to cancricide than the animal which has just been described. In size it is larger than the common Racoon, and its color is not quite the same.

The tail is short in proportion to the body, and is marked with six black rings upon a grayish or blackish-yellow ground. The fur of the body is rather variable in different individuals, but is generally composed of a blackish-gray washed with a tinge of yellow, the darker and the lighter tints predominating on different parts of the body and limbs. On the head, neck, and along the spine, the black tinge prevails, while the rest of the body and the sides of the neck are almost wholly of the yellowish-gray hue. A very dark brown patch encloses each eye, and, passing backwards almost to the ears, is merged into a dark spot on the crown of the head. The Racoon has been mentioned by several travellers under different names, such as Raton, Mapach, Agouarapopè, Yllanraton, Maxile, Wasch-Bär, and Cioutlamacasque.

The Racoon, an excellent figure of which is here given, is peculiar to the North American Continent. Its geographical range is very great, being found in every portion of North America, as high as 60°. Paraguay is as far south as it has been observed. Its habits are nocturnal. Though it is carnivorous by nature, it prefers vegetable food at times, as is the case with the Black Bear.

The Black-footed Racoon inhabits the Pacific coast from Puget's Sound to the Rio Grande in Texas. It is like the preceding in general appearance, but excels it in size.

The Psora, or California Coon (*Procyon psora*), was discovered on the Pacific coast just before the occupation of California by the United States. It is more dog-like in general appearance, standing higher, and having a slender tail. The Crab-eating Racoon is found in Central America and farther south.

THE animals which compose the curious genus that is known by the name of Narica, are easily recognized on account of the singular length of the nose, which is prolonged so as to form a miniature and mobile proboscis. In their general habits and diet they very strongly resemble the racoons, and are as admirable climbers of trees as can be found in the animal kingdom.

The extraordinary snout with which the Coaitis are gifted is very useful to the possessor, being employed for the purpose of rooting in the ground in search of worms and insects, together with other important uses. When they drink, the Coaitis lap the water after the manner of dogs, and when so engaged, turn up their flexible snouts, so as to keep that useful member from being wetted more than is necessary. They are inhabitants of Southern America, and are found in small companies upon the trees among which they reside, and on the thin branches of which they find the greater part of their food. Two examples of the Coaitis will be briefly described.

The COAITI-MONDI, or RED COAITI, derives its name from the reddish-chestnut hue which prevails over the greater portion of the fur, and is only broken by the black ears and legs, the maroon-colored bands upon the tail, and the white hairs which edge the upper jaw, and entirely cover the lower. The texture of the fur is rather harsh and wiry, and of no very great importance in commerce. Upon the paws are certain curious tubercles, which alone would serve to identify the animal were it entirely destroyed with the exception of a single foot. It is extremely active in the ascent and descent of trees, and pursues its prey among the limbs with great certainty. Its food consists of sundry vegetable and animal substances, but the creature seems to prefer the latter to the former.

When the Coaiti descends a tree, it does so with its head downward, securing itself from falling by hitching the claws of the hinder feet into the inequalities of the bark, and displaying by the act no small amount of flexibility in the jointing of the hinder limbs. It is a nocturnal animal, and does not display its true liveliness until the shades of evening begin to draw on, but lies curled up in a curious but comfortable attitude, its long and bushy tail serving for blanket and pillow. Towards evening, however, the Coaiti arouses itself from its lethargy, and becomes full of life and vigor, careering about the branches with extraordinary rapidity of movement and certainty of hold, and agitating its mobile nose with unceasing energy, as if for the purpose of discovering by the snout the presence of some welcome food.

It is a merciless robber of birds' nests, and will eat parent, eggs, or young with equal appetite.

Although possessed of a very irritable temper, the Coaiti is tamed without difficulty to a certain extent, but is always capricious in its affections, and cannot be trusted without danger. When attacked by men or dogs, the Coaiti fights desperately, and can inflict such dangerous wounds with its double-edged canine teeth, that it is, although so small an animal, no despicable antagonist.

THE singular creature which is known under the title of KINKAJOU, or POTTO, has been the means of perplexing systematic naturalists in their laudable attempts to place each animal in its proper position.

On account of its external aspect and its general habits, it has been considered as one of the Lemurine family, and was termed in consequence the Yellow Macauco, or the Yellow Lemur (*Lemur flavus*). As, however, the structure of its teeth and limbs is entirely different from that of the lemurs, and very closely approaches the carnivorous type, it has been placed among the flesh-eating animals, under the name of Mexican Weasel (*Viverra caudivolvula*). But the flat surfaces of its under teeth, and its curiously prehensile tail, are characteristics of sufficient importance to remove it from the pure carnivora, and place it among the animals which are capable of eating both animal and vegetable food, so that it has at present found a resting-place at the end of the ursine animals.

It is an inhabitant of Southern America, and is spread over a very large extent of country, so that it is known in different places under different appellations, such as Honey Bear, Manaviri, or Guchumbi. When full grown, the Kinkajou is equal to a large cat in size, but is very much stronger in proportion to the dimensions of its body. The color of the animal is a very light dun, obscurely traversed by narrow darker bands, that run over the back towards the ribs, and partly follow their course. Another darker band is observable round the neck, but all these marks are so very indistinct, that they can only be seen in a favorable light.

KINKAJOU, OR POTTO.—*Cercoleptes caudivolvulus.*

The most remarkable point in this animal is the extreme length and flexibility of the tongue, which the creature is able to protrude to a marvellous extent, and which it can insinuate into the smallest crevices in search of the insects which have taken shelter therein. It is said that the animal employs its long tongue for the purpose of thrusting that organ into the bee-cells, and licking out the sweet contents of the waxen treasury. With its tongue it can perform many of the offices of an elephant's trunk, and will frequently seize and draw towards its mouth the articles of food which may be beyond the reach of its lips. It has also been seen to use its tail for the same purpose.

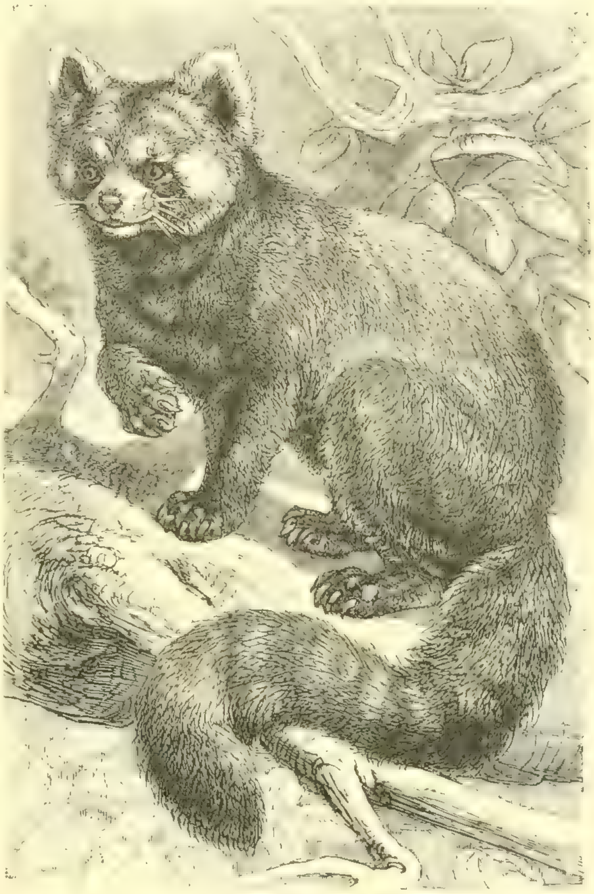
Assisted by its prehensile tail, the Kinkajou is an admirable and fearless climber, possessing the capability of suspending its body by the hinder feet and the tail, and remaining in this inverted attitude for a considerable space of time.

It is eminently nocturnal in its habits, being sadly distressed by the effect of daylight upon its eyes. The pupils of the eyes are capable of great dilatation, and when the unwelcome light of day falls upon them, they contract to a singularly small size, and their owner testifies by its uneasy movements the inconvenience which it feels. Not even the owl appears to be more disconcerted by the glare of the noontide light than does the Kinkajou. During the day, the animal lies buried in profound repose, from which it can with difficulty be aroused; but when the unwelcome light has passed away, the Kinkajou becomes extremely lively, and exhibits considerable activity of limb and playfulness of character, and runs up and down the branches with great skill, uttering at intervals a low, bleating kind of sound, and descending every now and then to drink. In descending, it makes use of its hinder claws in the same manner as has been related of the coaitis. In its native state, its food is of a mixed nature, consisting of fruits, insects, honey, small birds, eggs, and other similar substances.

It is easily tamed, and when domesticated is of a sportful nature, delighting to play with those persons whom it knows and trusts, and making pretence to bite, after the manner of puppies and kittens. It is very susceptible to kindness, and is fond of the caresses which are offered by its friends. In its wild state, however, it is a rather fierce animal, and when assaulted, offers such a spirited resistance even to human foes, that it will beat off any but a determined man, supposing him to be unarmed and unassisted.

There are few of the Mammalia which are decorated with such refulgently beautiful fur as that which decks the body of the Wah, or Panda, as it is also called.

This beautiful creature is a native of Nepal, where it is known under the different names of Panda, Chitwa, and Wah,—the last-mentioned name being given to it on account of its peculiar cry. The fur of the Panda is of a bright rich chestnut-brown, which rapidly darkens into a peculiarly rich black upon the ribs and the outside of the legs. The head is of a whitish-fawn color, with a ruddy chestnut spot under each eye. The tail is of the same chestnut hue as the body, and is marked with a series of dark rings. The head is very short, and thick muzzled, presenting a curious contrast to the coaitis and racoons.



PANDA, OR WAH.—*Ailurus fulgens.*

It is generally found among the trees that grow near rivers and mountain torrents, but does not seem to occur in sufficient numbers to render its beautiful fur an object of commercial value. This is the more to be regretted, as the coat of the Panda is not only handsome in appearance, but is very thick, fine, and warm in texture, being composed of a double set of hairs, the one forming a thick woolly covering to the skin, and the other composed of long glistening hairs that pierce through the wool and give the exquisitely rich coloring to the surface of the fur. The soles of the feet are not merely defended by nailed and thickened cuticles, but are furnished with a heavy covering of woolly hair, which in some species is of a light gray color, and in others of a snowy white, that contrasts strangely with the deep rich black of the legs and paws.

The food of the Panda is usually of an animal character, and consists chiefly of birds, their eggs, and the smaller Mammalia and insects, many of which it discovers on the trees whereon it is generally found.

INSECTIVORA;

OR, INSECT-EATING ANIMALS.

AMONG the animals which are comprised in the Insect-eating group, we find the Mole, the various Shrews, and the Hedgehog, as examples of the Talpidæ, or the family of the Moles.

As the food of these creatures is almost exclusively composed of insects, snail, worms, and similar animals, it is necessary that their teeth should be formed in a manner suitable to seizing and retaining their prey. Accordingly, on opening the mouth of a mole, a shrew, or a hedgehog, we find that none of the teeth are provided with flattened surfaces for the purpose of grinding the food, but that even the molar teeth are covered with sharp points, which are admirably suited for piercing and retaining their active prey, or for tearing it to pieces when it has been killed. All the insectivorous animals are plantigrade in their walk.

Some of these creatures, such as the shrew, present so close an external resemblance to the common mice, that they are popularly supposed to belong to the same class, and are called by the same general name. Many species live beneath the surface of the earth, and seek in that dark hunting-ground the prey which cannot be enticed to the surface in sufficient numbers to supply adequate nourishment for the ever hungry worm-devourers.

MOLE.—*Talpa europaea.*

Of all the insect-eating animals there is none which is better known by name than the common Mole, and very few which are less known by their true character.

On inspecting a living Mole that has been captured on the surface of the earth, and comparing it with the multitudinous creatures that find their subsistence on the earth's surface, rejoicing in the full light of day, and free to wander as they please, we cannot but feel some emotions of surprise at the sight of a creature which is naturally debarred from all these sources of gratification, and which passes its life in darkness below the surface of the ground.

Yet this pity, natural though it be, will be entirely thrown away, for there is scarcely any creature that lives which is better fitted for enjoyment, or which is urged by more fiery passions. Dull and harmless as it may appear to be, it is in reality one of the most ferocious animals in existence, and will engage in the fiercest combats upon very slight provocation.

While thus employed, its whole faculties are so entirely absorbed in its thirst for revenge, that it will leave the subterraneous shafts which it has been excavating, and join battle with its foe in the full light of day. Should one of the combatants overpower and kill the other, the victorious Mole springs upon the enemy, tears its body open, and plunging its nose into the wound, drinks the blood of its foe, and feasts richly on the sanguine banquet.

Such a combat was lately witnessed by one of my friends, who kindly wrote the account of the proceeding, and of the fate of one of the combatants.

"During a fine autumn afternoon, I was taking a walk in some woods, and had reached a very retired part of the path, when I suddenly heard a considerable scrambling amongst the dried leaves and underwood. Upon stooping to obtain a view of whatever might be causing the disturbance, I caught sight of two little black creatures engaged in fierce combat. They tumbled over one another, and were so much concealed by the leaves that they could not be easily distinguished.

"Scarcely had I obtained this view of the combatants than one of them began to retreat, and was quickly followed by his opponent. Seeing the direction in which they were running, I made way through the briars as quickly as possible, and placed myself directly in the path of the creatures. They came on quite unconscious of my presence, and dodged about within a few feet of me. I could now perceive that the creatures were either Moles or rats, and determined, whichever they might be, to capture one or both.

"Disregarding the thorns and thistles, I jumped through the underwood, and was then close to the animals, which immediately ceased their personal quarrel, and began sinking in a most ghost-like manner into the soil. This proceeding showed me that they were Moles.

"Not being particularly acquainted with the arrangement of the Mole's teeth, or with its disposition, I did not venture to take hold of either creature with my hand, but being anxious to effect a capture, I caught hold of the tail of one of the little fellows, and with the help of a sharp tug I pulled him out of the ground, and gave him an aërial voyage.

"He came to the ground without any apparent injury, and again began busily sinking a shaft. This time the back looked so very inviting, that I seized him by the short fur upon that portion of his body, and then found that I had him quite secure. He appeared very philosophical under the circumstances, and did not perform any unnecessary contortions, having very soon discovered that he was a safe prisoner. The next proceeding was to place him in my handkerchief, and to discover whether he could, either by his teeth or claws, make his way through the silk. No sooner was he suspended in this impromptu prison than he tried his utmost to work his way through the walls, but the silk yielded to him and would not open. A minute's exertion appeared to satisfy him, after which he laid himself calmly down. Having been occupied for some little time with this creature, I then sought after his companion, which had, however, effected his subterranean retreat, and was probably two feet beneath the surface.

"My prisoner was conveyed in safety to my domicile, and was placed in a large tub, over which for security a board was placed, and in which was some earth. The little gentleman was quite at home in his tub, and enjoyed himself amazingly with a 'Diet of Worms.' To supply him, however, with this luxury was not an easy task; half an hour's digging in a yielding soil brought to light scarcely a sufficient quantity of food for one day's consumption. Small worms of about two inches in length were quickly disposed of; whilst fine long ones were put out of sight in two meals. After feasting upon half a dozen or so, the Mole would look very much like a boy full of pudding, and appeared to take a little doze. No sooner, however, did a worm give him a flap on the nose with its tail than he awoke, and, with renewed vigor and appetite, demolished half a dozen more victims, when he would again subside into a quiet slumber.

"He lived in great ease and luxury during three days, at the end of which time he met an untimely end. The board upon his tub was accidentally knocked off by an awkward man, who forgot or neglected to replace it. A sly old tom-cat saw the Mole, and impelled by his own organ of destructiveness, killed, but would not eat our hero."

The cause of this curious combat was probably at no great distance, in the shape of a female Mole, for whose favor the two animals were so fiercely fighting. The Mole pursues its intended mate with extraordinary zeal and perseverance; and as the number of males is considerably greater than that of females, it seldom happens that a Mole succeeds in winning his bride until he has gained her in battle. So furious are all the passions of the Mole, that we may think ourselves fortunate that the creature is so small; for if it were as large as a tiger it would be by far the more formidable animal.

Even with its limited capability, it has more than once proved itself a dangerous creature; for on one occasion, a Mole that had been made prisoner turned fiercely on its captor, and fixed its teeth into his hand with such pertinacious courage that it would not loosen its hold until it had been squeezed nearly to death between the teeth of its antagonist, who was obliged to have resort to that unpleasant mode of defence in order to free himself from the infuriated little animal. Another of these creatures flung itself upon a young lady's neck, and inflicted a severe wound before its purpose could be comprehended or its movements arrested.

With the exception of sight, the senses of the Mole seem to be remarkably developed.

The sense of scent is singularly acute, and enables the animal to discover the presence of the earthworms on which it feeds, and to chase them successfully through their subterranean meanderings,—a kind of terrestrial otter. So acute is the sense of smell, that the experienced Mole-catchers are in the habit of keeping a dead Mole at hand when they are engaged in their destructive avocation; and after setting their traps, draw the dead Mole over every part of the trap or adjoining soil which their hands have touched, so as to overpower the taint of human contact. This is an effectual precaution, as the Mole is endowed with a powerful, very peculiar, and very unpleasant scent, that adheres pertinaciously to the hand, and cannot be entirely removed without repeated lavation.

The hearing of the Mole is proverbially excellent; and it is probable that the animal is aided in its pursuit of worms by the sense of hearing as well as that of smell. Much of the Mole's safety is probably owing to its exquisite hearing, which gives it timely notice of the approach of any living being, and enables it to secure itself by rapidly sinking below the surface of the earth. To tread so softly that the blind Mole may not hear a footfall, is an expression which has become a household word.

The sense of touch is peculiarly delicate, and seems to be chiefly resident in the long and flexible nose, which is employed by the Mole for other purposes than those of scent. When the creature is placed upon the surface of the ground, and is about to sink one of its far-famed tunnels, it employs its nose for that purpose almost as effectually as its armed fore-paws. I have often seen the animal engaged in the process of sinking a pit, and have observed that it always begins by running about very rapidly, wriggling its snout backwards and forwards upon the ground, as if to discover a soft spot. When it has fixed upon a suitable locality, it begins its excavation by rooting in the ground with its nose, and making a shallow groove in the earth by way of a commencement. Not until it has formed this preliminary trench does it bring its digging claws into action; and even while employing its natural spades in the actual digging and casting up of loose earth, it still makes use of its nose as a pioneer, so to speak, and seems to learn, by means of the delicate sense of touch with which that organ is gifted, the nature of the soil through which the animal intends to make its way.

It seldom happens that all the senses of an animal are developed to an equal extent, so that where one or two are singularly acute it is generally at the expense of the others. Such is the case with the Mole; for although the scent, touch, and hearing are remarkable for their excellence, the sight is so extremely defective that it may almost be considered as a nullity.

It is true that the Mole possesses eyes; but those organs of vision are so small, and so deeply hidden in the fur, that they can be but of little use to their owner, except to mark the distinctions between light and darkness. The eyes are so exceedingly small that their very existence has been denied, and it is only by a careful search that they can be seen at all.

The simplest mode of observing the Mole's eyes in perfection is to immerse the living animal in water. It fancies that it is in danger of drowning, and therefore exerts its power of protruding the eyes from the furry coat, in order to employ every means for escaping from the deadly peril. Its eyes are then perceptible, as little, black, beady objects that glitter through the fur, but do not appear to enjoy any great powers of vision. This power of protruding and withdrawing the eyes is rendered necessary by the subterranean habits of the animal, which is thus able to protect its eyes from the loose mould through which it is constantly passing.

In order to adapt the Mole to the peculiar life which it leads, the entire framework of its body is very wonderfully constructed. As its chief employment consists in digging, the entire strength of the animal seems to be concentrated in the fore-quarters, where the bones and muscles are developed to a marvellous extent. If the Mole be stripped of its skin, the muscles of the fore-limbs will be found to be so powerful that they roll between the fingers, hard, slippery, and almost incompressible. These enormous muscles give power and motion to the very efficient digging apparatus with which the Mole is endowed.

The fore-paws are extremely large, and furnished with strong and flattened nails. They are turned rather obliquely, as seen in the figure, in order to give free scope to their exertions. The bones of the fore-arm are of very great thickness, and bowed in that peculiar manner which always indicates enormous strength in the possessor. But the most striking and curious peculiarity in the structure of the Mole is the singularly long shoulder-blade, which, by its great length and strength, affords attachment to the powerful muscles which alone could give the requisite force to the broad, spade-like paws. The paws are devoid of the soft fur that shields the rest of the body, and are covered with a thick but naked skin. It is chiefly to these paws that any mould is found adherent when the Mole is captured, for the soft and velvet-like fur permits no earthy stain to defile its glossy smoothness.

The Mole's fur is remarkably fine in its texture, and is affixed to the skin in such a manner that it has no particular "grain," and lies smoothly in every direction. This peculiarity enables the Mole to proceed along its galleries with the necessary celerity.

The skin of the Mole is remarkably tough and thick, and is often used by the peasantry for the purpose of making purses. The process of manufacture is simple enough, consisting merely in cutting the animal across, just behind the shoulders, stripping the skin from the hinder portions, drying it carefully, and closing it by means of a string run round the edge.

The Mole is said to be an excellent swimmer, and to be able to cross rivers, when led to such an act by any adequately powerful motive. How far true this assertion may be, I cannot prove by personal experience; but I think that it is likely to be possible, for I have seen a Mole swim across the bend of a brook—a distance of some few yards—and perform its natatory achievement with great ease. I was not near enough to ascertain the mode of its progression, but it seemed to use its fore-paws as the principal instruments of locomotion.

From all accounts, the Mole seems to be a thirsty animal, and to stand in constant need of water, drinking every few hours in the course of the day. In order to supply this want it is in the habit of sinking well-like pits in different parts of its "runs," so that it may never be without the means of quenching its thirst. Everything that the Mole does is marked with that air of desperate energy which is so characteristic of the animal. The laborers in different parts of Europe all unite in the same story, that the Mole works for three hours "like a horse," and then rests for three hours, laboring and resting alternately through the day, and with admirable perception of time.

The well-known "mole-hills" which stud certain lands, and which disfigure them so sadly, however much their unsightliness may be compensated by their real usefulness, are of various kinds, according to the sex and age of the miner. The small hillocks which follow each other in rapid succession are generally made by the female Mole before she has produced her little family, and when she is not able to undergo the great labor of digging in the harder soil. Sometimes the "run" is so shallow as to permit the superincumbent earth to fall in, so that the course which the Mole has followed is little more than a trench. This is said to be produced by the little coquetries that take place between the Mole and his future mate, when the one flies in simulated terror, and the other follows with undisguised determination.

Deeper in the soil is often found a very large burrow, sufficiently wide to permit two Moles to pass each other. This is one of the high-roads which lead from one feeding-ground to another, and from which the different shafts radiate.

But the finest efforts of talpine architecture are to be found in the central fortress, from which the various roads diverge, and the nest which the maternal Mole forms for the security of her young.

The fortress is of a very peculiar construction, and is calculated to permit the ingress or egress of the Mole from almost any direction, so that when its acute senses give notice of the approach of an enemy, it can make its retreat without difficulty.

The first operation is to build a tolerably large hill of compact and well-trodden earth. Near the summit of this mound the excavator runs a circular gallery, and another near the bottom, connecting the two galleries with five short passages. It then burrows into the centre of the mound, and digs a moderately large spherical hole, which it connects with the lower gallery by three passages. A very large passage, which is a continuation of the high-road, is then driven into the spherical chamber by dipping under the lower gallery, and is connected with the circular chamber from below. Lastly, the Mole drives a great number of runs, which radiate from the rest in all directions, and which all open into the lower circular gallery. It will be seen from this short description, that if a Mole should be surprised in its nest it can withdraw through its central chamber and so reach the high-road at once, or can slip through either of the short connecting galleries and escape into any of the numerous radiatory runs.

In the central or middle chamber of the edifice the Mole places a quantity of dried grass or leaves, upon which it sleeps during its hours of repose. This complicated room is seldom used during the summer months, as at that time the Mole prefers to live in one of the ordinary hillocks.

The nest which the female contrives is not so complicated as the fortress, but is well adapted for its purpose. The hillock in which the nest is made is always a very large one, and is generally placed at some distance from the fortress. Its interior is very large, and is generally filled with dried grass, moss, or other similar substances, and it is said that in some of these nests have been found certain roots on which the young Moles can feed during the first weeks of their existence.

The young are usually born about April, but their appearance in the world is not so determinately settled as that of many animals, as young Moles are found continually from March until August. The average of their number is four or five, although as many as seven young have been found in one nest. There is but one brood in a year.

The color of the Mole is usually of a blackish-gray, but it is extremely variable in the tinting of its fur, and it is not uncommon to find in a single locality specimens of every hue from brown to white. There are specimens in the museums of almost every tint, and I have long had in my possession a cream-colored Mole-skin.

The fur is so beautifully smooth and soft that it has sometimes, though rarely, been employed as an article of wearing apparel, or used as a light and delicate coverlet. The fur, or "felt," is best and most glossy if the animal is taken in the winter.

Whether the Mole is more useful or hurtful to the agricultural interest is at present a mooted point, and seems likely to continue so. It cannot be denied, however, that the subterraneous passages of the Mole, added to those of the earthworms, form a very complete system of subsoil drainage, and that the creature is continually enriching the surface of the ground by bringing fresh earth from a considerable depth, and thus involuntarily performing the office of a plough or a spade.

One of the animals which forms a link between the Moles and the Shrews, and seems to possess some of the peculiar habits of each, is the curiously formed Scalops, or Shrew-Mole.

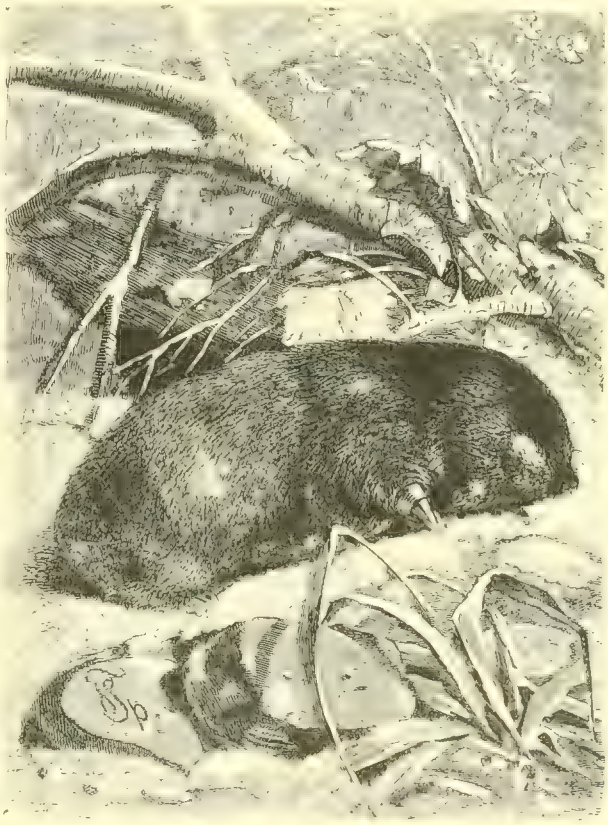
This creature seems to be peculiar to Northern America, and is generally found near the banks of rivers, being very water-loving in its habits. Like the ordinary mole, the Scalops passes the greater portion of its existence below the surface of the ground, and finds a subsistence among the worms and other creatures which it captures during its subterraneous meanderings. The muzzle of the Scalops is even more remarkable than that of the common mole, being much longer in proportion to the size of the animal, and is cartilaginous at its extremity. The claws of the fore-feet are very long and flattened, and are arranged in such a manner as to present a sharp point to the earth when the creature exercises them in the act for which they were intended. The hinder feet and legs are extremely small, and the tail is but short. There is no apparent outward vestige of an ear, and the eyes are almost invisible. In size it equals the common European Mole, being about seven inches in total length.

Another similar animal, the Desman of Russia, has been frequently mistaken for the Shrew-Mole, but it can be easily distinguished at a casual glance by the greater length of its tail and its superior size; its total length being sixteen or seventeen inches.

The CHRYSOCHLORE, or SHINING MOLE, or CHANGEABLE MOLE, has derived its various names from the very peculiar character of its fur.

The color of the Chrysochlore's coat is of a character that resembles "shot" silk, or the peculiar changeable metallic radiance which is thrown from the feathers of many birds. According to the light in which the animal is viewed, the fur is in some parts of a golden or bronzed green, and in others of a bronzed red, these brilliant hues interchanging among themselves as the animal moves, or as the light falls at different angles upon the fur. The name Chrysochlore is derived from two Greek words, signifying gold-green, and is happily applicable to the very singular coloring of the animal. The term *holosericea* is also Greek, and signifying "wholly silken," in reference to the lustrous surface of the hairs.

Even putting aside the strange chromatism of the fur, the creature is a very remarkable one in many respects, and especially deserving of notice on account of its teeth and its feet.



CAPE CHRYSOCHLORE, OR CHANGEABLE MOLE.—*Chrysochloris holosericea.*

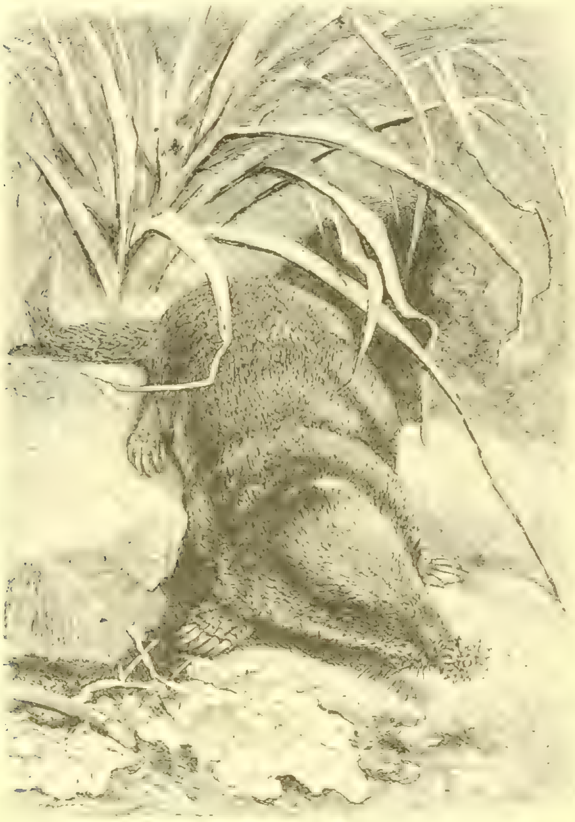
The teeth of the Changeable Mole are arranged in a very peculiar mode, being separated from each other by an interval that is equal to their thickness, so that when the jaws are closed, the teeth of either jaw fit exactly into the interstices that are left between those of the opposite jaw, like the iron serrations of a steel-trap. It has been well remarked that "the Chrysochlore affords, it is believed, the only example in the animal world of teeth being opposed by their anterior and posterior faces. The skeleton is altogether a singular one, for there are no less than nineteen pairs of ribs, and in one species twenty pairs have been made out. The first rib is thick and broad in proportion to the others.

The fore-feet are furnished with four toes, the fourth toe being very small, and tipped with a nail of ordinary size. The other three toes are armed with most formidable claws, by means of which the animal is enabled to dig into the earth. The middle toe carries a claw of surprising dimensions, as may be seen on reference to the engraving. The hinder feet are five-toed, and of no very great proportional size. The eye is externally invisible, being covered with skin, so that the animal appears to be practically blind. There are no ears, and no tail. The size of the creature is rather less than that of the common European Mole.

As may be perceived from its title, it is a native of the Cape of Good Hope, although it was formerly thought to inhabit Siberia. It is also known by the name of the Hottentot Chrysochlore; and the French name is Taupe dorée, or Gilded Mole. Its food consists, like that of the other Moles, of worms and various insects.

Even in a stuffed specimen, or in an uncolored engraving, the aspect of the **Radiated Mole** is a most grotesque and singular one; but its quaint uniqueness is much more striking when the animal is alive and in full health.

The most remarkable point in this animal is the muzzle, which is produced into a long, slender proboscis, round the extremity of which are arranged a number of soft, fleshy rays, of a bright rose-color, radiating like the petals of a daisy, or the tentacles of a sea-anemone. These curious rays, or caruncles, as they are more scientifically termed, can be spread or closed at pleasure, and present a strange spectacle when in movement. Their probable object is that they may serve as a delicate organ of touch, to aid the animal in procuring the worms and insects on which it feeds. The openings of the nostrils are situated in the centre of the radiated disc. The number of the caruncles is about twenty.



RADIATED MOLE, OR STAR-NOSED MOLE—*Condylura cristata.*

On account of the proportionately lengthened tail, the animal is sometimes called the Long-tailed Mole; for the tail is two inches and a half in length, while the head and body only measure four inches and a half. Another name by which it is known is the Condylure, or "knotty tail," an epithet which has been applied to it because, when a specimen is dried, the skin of the tail contracts so firmly over the vertebræ that the separate bones exhibit their form through the skin, and give to the tail a knotted aspect. The color of the fur is much like that of the common Mole, being a velvety blackish-gray on the upper portions of the body, and paler on the under parts. The eyes are extremely small, and there is no external indication of ears. It is an inhabitant of Canada and the United States.

The Mole (*Talpa*) is peculiar to European countries, while the American animal, so called (*Scalops*), is equally characteristic of this country. They have a strong resemblance to each other, and are equal in size.

The Silver or Prairie Mole (*Scalops argentatus*) is very similar to the preceding, small specimens being with difficulty distinguished from it. It inhabits Mexico and Texas.

A dark purplish-black species (*S. townsendi*) is found in the West, and called the Oregon Mole. Another is called *S. breweri*, or Hairy-tailed Mole.

The Star-nose Mole, a very common and familiar species, is here well represented. The curious star-like appendage on its nose is not clearly understood.

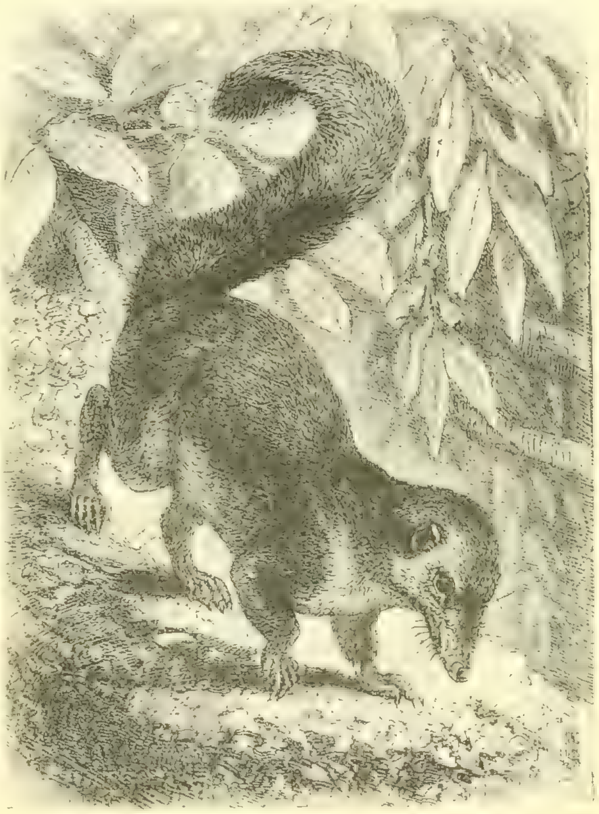
In the family *Soricidæ*, the Shrews, a large number of species are enumerated. They are mouse-like in appearance, with an elongated muzzle. Of the sub-family *Soricinæ*, we have three genera belonging to North America. These are spread over the whole of the northern hemisphere; some being found very far north. The region of the Rio Grande is their southernmost limit.

As an Order, known as *Insectivora*, or Insect-eaters, these animals are not largely represented in America. They are not found in South America, nor in Australia. It is an interesting fact that the regions forming the exception are those having Marsupial animals; the latter being found in no other lands.

The insect-eating animals which have already been described are in the habit of searching for their prey under the surface of the earth, and are furnished with extremely imperfect means of sight. But the curious examples of Insectivora which are collected into the single genus Tupaia are of a very different nature, living in the full light of day, and seeking their insect prey among the branches of the trees on which they dwell. It needs, therefore, that animals which obtain their food in such a manner should be endowed with excellent powers of vision; and we find accordingly that the Tupaias—which animals will be represented by two examples—are furnished with good eyes and quick sight. Indeed, the entire aspect of these creatures reminds the observer more of the squirrels than of the moles. The Tupaias are inhabitants of Sumatra and parts of India.

The head of this animal is very singular in its shape, which is well represented in the engraving. The upper jaw is slightly longer than the lower, and the muzzle considerably elongated, so that the head has a strangely dragon-like aspect, which is heightened by the position of the ears, which are set very far back, and by the long sharp rows of teeth which arm each jaw. The long bushy tail of the Tupaia gives it a kind of resemblance to the squirrel, a resemblance which is appreciated by the native Sumatrans, who call the squirrels and the Tupaias by the same name. The feet are plantigrade, and terminated by five toes on each foot, armed with small, but sharp nails, which assist the animal in climbing, and are sufficiently elevated to be spared from friction against the ground. In the hinder feet the fourth toe is the longest. The hair is of a silky texture, and tinged with brown and yellow by reason of the alternate colored rings with which each hair is marked. On the tail the hair is long and bushy, and hangs equally on each side, after the manner that is learnedly termed "distichous."

These animals are variously named by different zoological writers, and the genus in which they are placed is by some termed Tupaia, after the native name, by some Hylogale, and by others Cladobates. The last mentioned term seems to be in greatest favor, and is a very appropriate one, signifying "branch-traverser."

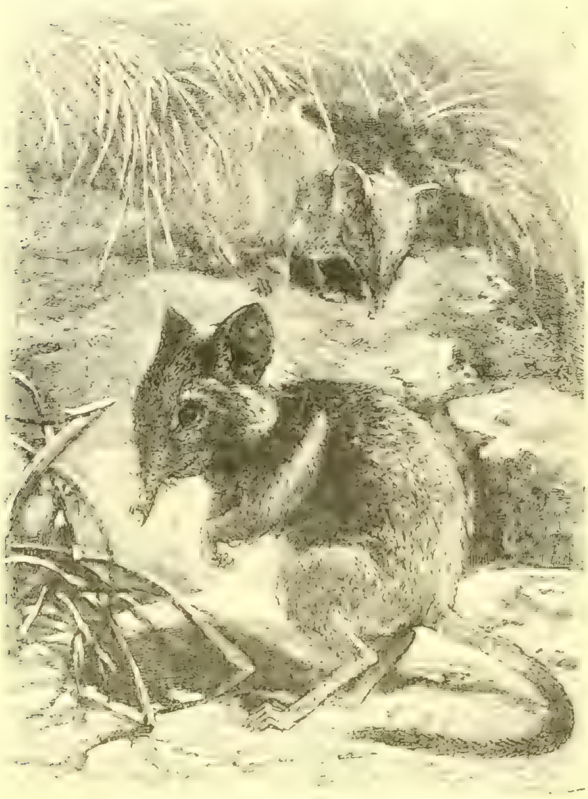

TUPAIA-TANA.—*Cladobates tana.*

The extraordinary animal which has been recently brought before the notice of zoologists, under the characteristic name of Pen-tail, is a native of Borneo, from which country it was brought by Mr. Hugh Low.

It is about the size of a small rat, but appears to be of greater dimensions on account of its extremely long tail with the remarkable appendage at its extremity. The tail is of extraordinary length when compared with the size of the body, and is devoid of hair except at its extremity, where it is furnished with a double row of stiff hairs on each side, which stand boldly out, like the barbs of a quill pen, or the feathers of an arrow. The remainder of the tail is covered with scales, which are square in their form, like those of the long-tailed rats, and of considerable size. The color of the tail is black, and the bristly barbs are white, so that this member presents a peculiarly quaint aspect.

The fur which covers the body of the Pen-tail is extremely soft in texture, and is of a blackish-brown tint above, fading into a yellowish-gray beneath. As the tips of the hairs are tinged with a yellow hue, the precise tint of the fur is rather indeterminate, and is changeable, according to the position of the hairs which are exposed to view. The specimen which is preserved in the British Museum was captured by Mr. Low in the house of Sir James Brooke, the celebrated Rajah of Sarāwak.

It is presumed that the long tail of the Pen-tail is used for the purpose of balancing itself in its progress among the branches of trees; but this conjecture is only problematical, as the habits of the animal are not yet known. By the arrangement and form of the teeth, it is supposed to be allied to the Tupaias.



ELEPHANT SHREW.—*Macroscelides typicus.*

THE elongation of the nose, which has already been noticed in the Tupaias of Sumatra, seems to have reached its utmost limit in those curious inhabitants of the Cape that are called, from their elephantine elongation of nose, the ELEPHANT SHREWS. Several species of Elephant Shrews are known to exist, all of which, with one exception, are inhabitants of Southern Africa. The solitary exception, Macroscelides Roretti, is found in Algeria.

The peculiarly long nose of the Elephant Shrew is perforated at its extremity by the nostrils, which are rather obliquely placed, and is supposed to aid the animal in its search after the insects and other creatures on which it feeds. The eyes are rather large in proportion to the size of the animal.

The tail is long and slender, much resembling the same organ in the common mouse, and in some specimens, probably males, is furnished at the base with glandular follicles, or little sacs. The legs are nearly of equal size, but the hinder limbs are much longer than the fore-legs, on account of the very great length of the feet, which are capable of affording support to the creature as it sits in an upright position. As might be presumed from the great length of the hinder limbs, the Elephant Shrew is possessed of great locomotive powers, and when alarmed, can skim over the ground with such celerity that its form becomes quite obscured by the rapidity of its movement through the air. Its food consists of insects, which it captures in open day.

Although the Elephant Shrew is a diurnal animal, seeking its prey in broad daylight, its habitation is made below the surface of the ground, and consists of a deep and tortuous burrow, the entrance to which is a perpendicularly-sunk shaft of some little depth. To this place of refuge the creature always flies when alarmed, and as it is so exceedingly swift in its movements, it is not readily captured or intercepted.

The color of the fur is a dark and rather cloudy brown, which is warmed with a reddish tinge upon the sides and flanks, and fades on the abdomen and inner portions of the limbs into a grayish-white. The generic name, Macroscelides, is of Greek origin, in allusion to the great length of its hinder limbs, and signifies "long-legged." It is but a small animal, as the length of the head and body is not quite four inches in measurement, and the tail is about three inches and a quarter.

PASSING in a regular gradation from the moles to the shrews and hedgehogs, we pause for a while at the powerfully scented animal that is called, by virtue of its perfumed person, the MUSK-RAT of India, and is also known by the titles of MONJOUROU, and SONDELI.

This animal is a native of various parts of India, and is very well known on account of the extremely powerful scent which exudes from certain glands that are situated in the under parts of the body and on the flanks.

The odoriferous substance, which is secreted by the above-mentioned glands, is of a musky nature, and possesses the property of penetrating and adhering to every substance over which the Musk-Rat has passed. The musky odor clings so pertinaciously to the objects which are impregnated with its tainting contact, that in many cases they become entirely useless. Provisions of all kinds are frequently spoiled by the evil odor with which they are saturated; and of so penetrating a nature is the musky scent, that the combined powers of glass and cork are unable to preserve the contents of bottles from its unpleasant influence. Let but a Sondeli run over a bottle of wine, and the contained liquid will be so powerfully scented with a musky savor that it will be rendered unfit for civilized palates, and must be removed from the neighborhood of other wines, lest the contaminating influence should extend to them also.

ERD SHREW.—*Corsira vulgaris.* SONDELI.—*Sorex murinus.*

In color it is not unlike the common shrew, having a slight chestnut, or reddish tinge, upon a mouse-colored ground, fading into gray on the under parts of the body. In size, however, it is much the superior of that animal; being nearly as large as the common brown or "Hanoverian" rat. The hair is very short, and the peculiar reddish-brown hue of the fur is caused by the different tintings of the upper and under fur.

DURING the autumnal months of the year, the country roads and by-paths are frequently rendered remarkable by the presence of little mouse-like animals, with long snouts and peculiarly squared tails, that lie dead upon the ground, without mark of external injury to account for the manner of their decease.

There are probably many other such corpses upon the wide and grassy meadow lands, but, owing to the nature of the ground, they are not so conspicuous as those upon the smoothly trodden paths. The presence of these deceased creatures is the more remarkable, because there are so many predatory animals and birds, such as cats, weasels, stoats, owls, and hawks, which would be very likely to kill such small prey, but, having slain them, would be almost sure to eat them. These unsepultured remains are the bodies of the SHREW-MOUSE of England, otherwise known by the name of ERD SHREW. Another title by which this little animal is known, in some parts of England, is the Fetid Shrew; a name which has been given to it on account of the powerful scent which it exudes; and the creature is called in Scotland the Ranny, a name which is evidently modified from the Latin term, *araneus*, or spider-like, which has been applied to this animal by several writers, because it was said to bite poisonously like a spider.

The teeth of the true Shrew are very peculiar, so much so, indeed, that they cannot be mistaken for those of any other animal. Their peculiarities are mostly remarkable in the incisor teeth, which are extremely long; those of the upper jaw being curved and notched at their base, while those of the lower jaw project almost horizontally. There are no canines, and the molars differ slightly in arrangement, according to the species. In the Erd Shrew the tips of the teeth are tinged with a blood-colored brown.

The head of the Shrew is rather long, and its apparent length is increased by the long and flexible nose which gives so peculiar an aspect to the animal, and serves to distinguish it at a glance from the common mouse, which it so nearly resembles in general shape and color. The object of this elongated nose is supposed to be for the purpose of enabling the animal to root in the ground after the various creatures on which it feeds, or to thrust its head among the densest and closest herbage. Many insects and their larvæ are found in such localities, and it is upon such food that the Shrew chiefly subsists. Worms are also captured and eaten by the Shrew, which in many of its habits is not unlike the mole.

The habitation of the Shrew is in certain little subterraneous tunnels, which it excavates in the soil, and which serve as a hunting-ground as well as a home. Like the mole, the Shrew is very impatient of hunger, and cannot endure a protracted fast, although it may not be so inordinately voracious as that velvet-coated animal, which it is said will die of hunger if it be kept without food for six hours. It has been suggested, that the many dead Shrews which are found in the autumn owe their deaths to starvation, the worms having descended too deeply into the ground for them to follow, and the insects, being pinched with the cold, having concealed themselves in their wintry hiding-places.

If this be the case, the curious phenomenon of dead Shrews lying uninjured on the ground will be readily cleared up, although it will not account for the singular fact that the dead animals are not carried off by cat, weasel, or owl. For this portion of the phenomenon another reason must be found; which probably exists in the rank and powerful scent which saturates the body of the Shrew, and which is sufficiently unpleasant to deter cats and other animals from eating its flesh.

Owls, however, will eat the Shrew, as has been found by examination of the pellets which are ejected by owls and other birds of prey, and which contain the skin, feathers, bones, and other indigestible portions of the creatures on which they prey. Twenty such pellets, or casts, as they are technically termed, were examined for the purpose of ascertaining their component parts, and no less than seven Shrew skeletons were discovered in the *débris*. Moles are said to be among the number of the Shrew's enemies, and to make occasional havoc among the pretty little creatures.

Sometimes the Shrews mutually kill each other, for they are most pugnacious little beings, and on small ground of quarrel enter into persevering and deadly combats; which, if they took place between larger animals, would be terrifically grand, but in such little creatures, appear almost ludicrous. They hold with their rows of bristling teeth with the pertinacity of bull-dogs, and, heedless of everything but the paroxysm of their blind fury, roll over each other on the ground, locked in spiteful embrace, and uttering a rapid succession of shrill cries, which pierce the ears like needles of sound.

It is a most fortunate circumstance that the larger animals are not so vindictively pugnacious as the moles and the Shrews; for it would be a very hard case if we were unable to put two horses or two cows in the same field without the certainty of immediate fight, and the probability that one of the combatants would lose its life in the struggle. Such, however, is the case with the Shrews; for if two of these little quadrupeds be confined in the same box, they are sure to fight to the death, and the consummation of the combat is, generally, that the vanquished foe is eaten by the victor.

However great may be the damage which the bite of such tiny teeth may inflict upon each other, yet the bite of a Shrew is so insignificant as to make hardly any impress even on the delicate skin of the human hand.

Popular prejudice, however, here steps in, and attributes to the bite of the Shrew such venomous properties that in many parts of the world the viper is less feared than the little harmless Shrew. The very touch of the Shrew's foot is considered as a certain herald of evil, and animals or men which had been "Shrew-struck" were supposed to labor under a malady which was incurable except by a rather singular remedy, which partakes somewhat of the homœopathic principle, that "similia similibus curantur."

The curative power which alone could heal the Shrew-stroke lay in the branches of a Shrew ash, or an ash-tree which had been imbued with the shrewish nature by a very simple process. A living Shrew was captured and carried to the ash-tree which was intended to receive the healing virtues. An auger-hole was made into the trunk, the poor Shrew was introduced into the cavity, and the auger-hole closed by a wooden plug. Fortunately for the wretched little prisoner, the entire want of air would almost immediately cause its death. But were its little life to linger for ever so long a time in the ash-trunk, its incarceration would still have taken place, for where superstition raises its cruel head, humanity is banished.

The popular ideas respecting the Shrew's bite, which once reigned even over the scientific world, and are still in full force throughout many portions of the rural districts, may be gathered from the following extract from a curious old zoological author named Topsel, in his "History of Four-footed Beasts and Serpents," published in London in the year A.D. 1658, p. 406:—

"It is a ravening beast, feigning itself gentle and tame, but being touched, it biteth deep, and poysoneth deadly. It beareth a cruel minde, desiring to hurt anything, neither is there any creature that it loveth, or it loveth him, because it is feared of all. The cats, as we have said, do hunt it, and kill it, but they eat not them, for if they do, they consume away and die. They annoy vines, and are seldom taken, except in cold; they frequent ox-dung, and in the winter time repair to houses, gardens, and stables, where they are taken and killed.

"If they fall into a cart-road, they die, and cannot get forth again, as *Marcellus*, *Nicander*, and *Pliny* affirm. And the reason is given by *Philes*, for being in the same, it is so amazed, and trembleth, as if it were in bands. And for this cause some of the ancients have prescribed the earth of a cart-road to be laid to the biting of this mouse as a remedy thereof. They go very slowly; they are fraudulent, and take their prey by deceit. Many times they gnaw the oxes hoofs in the stable.

"They love the rotten flesh of ravens; and therefore in *France*, when they have killed a raven, they keep it till it stinketh, and then cast it in the places where the Shrew-mice haunt, whereunto they gather in so great a number, that you may kill them with shovels. The *Egyptians*, upon the former opinion of holiness, do bury them when they die. And thus much for the description of this beast. The succeeding discourse toucheth the medecines arising out of this beast; also the cure of her venomous bitings.

"The Shrew, which by falling by chance into a cart-rode or track, doth die upon the same, being burned, and afterwards beaten, or dissolved into dust, and mingled with goose-grease, being rubbed or anointed upon those which are troubled with the swelling coming by the cause of some inflammation, doth bring into them a wonderful and most admirable cure and remedy. The Shrew being slain or killed, hanging so that neither then nor afterwards she may touch the ground, doth help those which are grieved and pained in their bodies, with sores called fellons or biles, which doth pain them with a great inflammation, so that it be three times environed or compassed about the party so troubled.

"The Shrew which dyeth in the furrow of a cart-wheel, being found and rowled in potter's clay or a linnen cloth, or in crimson, or in scarlet woollen cloth, and three times marked about the impostrumes, which will suddenly swell in any man's body, will very speedily and effectually help and cure the same.

"The tail of a Shrew being cut off and burned, and afterwards beaten into dust, and applyed or anointed upon the sore of any man, which came by the bite of a greedy and ravenous dog, will in very short space make them both whole and sound, so that the tail be cut from the Shrew when she is alive, not when she is dead, for then it hath neither good operation, nor efficacy in it."

It is probable that this virulent hatred of the Shrew, and this groundless terror of its bite, was caused by the rank scent which exudes from the creature, and the acknowledged fact that the Shrew is frequently seen in the close vicinity of reposing cattle. But as the Shrew is an insectivorous animal, it has been well suggested that its habit of frequenting the neighborhood of cattle may be in consequence of the flies and other insects which are always found in such localities, and on which the Shrew hopes to make a meal.

It has already been mentioned that the Shrew will eat one of its own species if slain in battle, and it is therefore evident that its food does not wholly consist of insects and worms, but is occasionally varied by other and more generous diet. One of these little creatures has been discovered and killed while grasping a frog by the hind-leg; and so firmly did it maintain its grasp, that even after its death the sharp teeth still clung to the limb of the frog.

Whether the creature intended to eat the frog, or whether it was urged to this act by revenge or other motive, is uncertain.

The nest of the Shrew is not made in the burrow, as might be supposed, but is built in a suitable depression in the ground, or in a hole in a bank. It is made of leaves and other similar substances, and is entered through a hole at the side. In this nest are produced the young Shrews, from five to seven in number, and, as may be imagined, extremely diminutive in size. They are generally born in the spring.

The total length of the adult Shrew is not quite four inches, of which the tail occupies very nearly the moiety. The tail is remarkable for being square in form instead of cylindrical, and on account of that circumstance it has received from some authors the specific name of *tetragonúrus*, or Square-tail.

SIMILAR to the erd Shrew in general aspect, but easily to be distinguished from that animal by its color and other peculiarities, the WATER SHREW stands next on our list.

This little creature was for many years supposed to be identical with the erd Shrew, and its aquatic propensities thought to be the ebullition of joyous existence, which was not content with disporting itself upon the earth, but must needs seek a further vent for its happiness among the waters.

However, the Water Shrew is now acknowledged to be a separate species, and may be distinguished from the erd Shrew by the following characteristics.

The fur of the Water Shrew is nearly black upon the upper portions of the body, instead of the reddish-brown color which tints the fur of the erd Shrew. The under parts of the body are beautifully white, and the line of demarcation between the two colors is very distinctly drawn. The fur is very soft and silken in texture, and, when the animal is submerged under the surface of the water, possesses the useful property of repelling moisture, and preserving the body of the animal from the injurious effects of the water.

When the Water Shrew is engaged in swimming, those parts of the fur which are submerged below the surface appear to be studded with an infinite number of tiny silvern beadlets, that give to the whole animal a very singular aspect. This phenomenon is produced by the minute air-bubbles that cling to the fur, and which exude from the space that is left between the hairs. This curious appearance is well shown in our engravings of Shrews.

A further distinction, and one which is more valuable than that which is furnished by the color of the fur, is the fringe of stiff white hairs which edges the tail and the toes, and which is evidently of great use in the natatory movements of the animal.

The Water Shrew finds its food in various ways. Sometimes it burrows in the muddy river banks, rooting in the soft earth with its elongated nose, and dislodging the larvæ of certain insects that pass that stage of their existence in the mud. It also chases and captures various aquatic insects as they move through the water, and will not disdain to feed upon moths and other similar creatures which have fallen or have been blown into the water and then drowned.

In all its movements, the Water Shrew is extremely graceful and active, displaying equal agility, whether its movements be terrestrial or aquatic. As the sphere of its vision does not appear to be very extended, it can easily be approached while it is engaged in its little gambols, and can be watched without much difficulty.

I have repeatedly observed the proceedings of a little colony of these creatures, and was able to sit within a yard or two of their haunts without their cognizance of my person. They are most sportive little creatures, and seem to enjoy a game of play with thorough appreciation, chasing each other over the ground and through the water, running up the stems of aquatic plants, and tumbling off the leaves into the water, scrambling hastily over the stones around which the stream ripples, and playing a thousand little pranks with the most evident enjoyment. Then they will suddenly cease their play, and begin to search after insects with the utmost gravity, rooting in the banks, and picking up stray flies, as if they never had any other business in view.

As it is in the habit of repeatedly passing over the same ground in these mutual chases, it soon treads a kind of path or road upon the land, which, although very obscurely marked, is yet sufficiently well defined to attract the attention of any one who is conversant with the habits of these little creatures.

Being an excellent diver, and fond of submerging itself wholly beneath the surface, the Water Shrew would suffer great inconvenience were its ears to be constantly filled with the liquid element in which it moves; and in order to avert such an inconvenience, a special provision of nature is needed. For this purpose the ears are peculiarly formed, so that as soon as the animal is wholly submerged, the pressure of the water acts upon three small valves, which fold together and effectually prevent the entrance of a single drop of water into the cavity of the ear. As soon as the animal rises to the surface, the pressure is removed, and the ears unfold like the petals of a flower, when the sun shines warmly on them.

From repeated observations, it seems that the Water Shrew is not entirely confined to the neighborhood of water, neither is it totally dependent for its subsistance on aquatic insects, for it has been frequently seen at some distance from any stream or pond.

It must be remarked, however, that a very small rivulet is amply sufficient for the purposes of the Water Shrew, which will take up its residence for several years in succession on the banks of a little artificial channel that is only used for the purpose of carrying water for the irrigation of low-lying fields.

It is believed that the Water Shrew is a more prolific animal than the erd Shrew, for whereas the latter creature produces from five to seven young at a litter, the former is blessed with a family of seven, eight, or nine in number, six or seven being the ordinary average.

The total length of the Water Shrew is not quite four inches and a half, the length of the head and body being a little more than three inches, and that of the tail being about two inches. Its snout, although long, is not quite so narrow and pointed as that of the erd Shrew, and its ears are remarkably small. When it swims, it has a curious habit of spreading out its sides, so as to flatten the body as it floats upon the water.

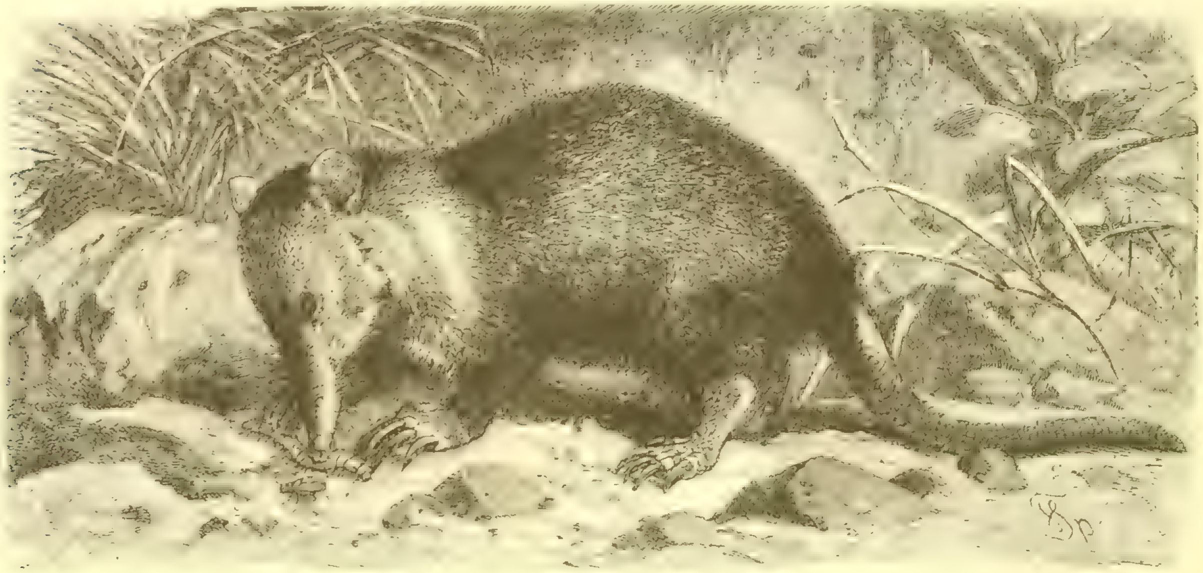
THE largest of the European Shrews is that species which is called the OARED SHREW, on account of the oar-like formation of the feet and tail; which are edged with even longer and stiffer hairs than those which decorate the same parts in the water Shrew.

As may be imagined from this structure, the habits of the animal are aquatic in their nature, and its manners are so closely similar to those of the preceding species, that it may easily be mistaken for that animal, when seen at a little distance, so as to render the difference in size less conspicuous, and the color of the under portions of the body less apparent.

It has already been stated that the back of the water Shrew is of a velvety black, and the abdomen and under portions of the body of a beautiful and clearly defined white. In the Oared Shrew, however, the back is profusely sprinkled with white hairs, and the fur of the abdomen and flanks is blackish-gray instead of pure white. The middle of the abdomen, however, together with that of the throat, is strongly tinged with yellow; the throat being more of an ashy yellow than the abdomen.

Although not so common as the erd and the water Shrew, it is of more frequent occurrence than is generally supposed, and has been found in many parts of Europe, where it was formerly supposed to be wanting.

The total length of the Oared Shrew is about five inches and a quarter, the head and body measuring rather more than three inches, and the tail being about two inches in length. Its nose is not quite so sharp or narrow as that of the water Shrew, and the ears are decorated with a slight fringe of white hair. The latter third of the tail is flattened, as if for swimming, while the remaining two-thirds are nearly cylindrical, but are slightly squared, as has been already mentioned of the common Shrew.



AGOUTA, OR SOLENODON.—*Solenodon paradoxum*

On account of the general darkness of its fur, it is sometimes called the Black Water Shrew, and is catalogued in some museums under that title. The generic name, Crossopus, is of Greek origin, and signifies "fringed-feet."

There is another Shrew, called the Rustic Shrew (*Corsira rustica*), which is very common throughout Ireland, and is also found in many parts of Northern Europe. Among the Shrews is found the smallest known mammalian animal of the present day; being even smaller than the tiny harvest-mouse, which has been made so famous by Mr. White's elegant description of itself and its habits in his "Natural History of Selborne." This most minute quadruped is only one inch and a half in length, exclusive of the tail, which measures about an inch. The name of this minikin among mammals is the Etruscan Shrew, and its habitation is in Italy. Specimens are said to have been discovered in Algeria.

The specific title of Paradoxus, or puzzling, has very appropriately been given to the Agouta; a little animal which is peculiar to Hayti, and which combines in its own person several characteristics that properly belong to different families of animals.

Were the observer to pay regard only to the external peculiarity of fur, ears, and tail, he would be inclined to place it among the opossums; but if he were to lay the greatest stress upon the teeth, he would probably assign it to a place among the shrews.

It seems, however, that it is really allied to the latter group of animals, and it is therefore placed in the position which it at present holds in zoological catalogues. The fur of the Agouta is long, harsh, and coarse in texture, and its color is an undecided red, tinged with yellow. The nose is extremely elongated, like that of the shrews, and strengthened at its base by a slender bone, so that it appears to be intended for the purpose of digging in the earth like those animals. The nostrils are placed at the extremity of the snout, and are divided from each other by a distinct furrow. The cheeks and lips are decorated with whisker-hairs of very great length; the eyes are very small; the ears are moderate in size, and rounded, and almost devoid of hairy covering. All the feet are terminated with five toes, and the long claws are curved, rather compressed, and evidently fitted for the purpose of scraping at the soil.

The tail is moderately long, measuring about nine inches in length, and is rounded throughout its length, remainder of the head and body being rather more than a foot long. It is not covered with hair, but is rather naked and for the greater part of its length is scaly. The lower jaw is rather shorter than the upper.

The teeth of the Agouta are very remarkable, both for their arrangement and their form, but are very difficult to describe. The two middle incisors of the upper jaw are extremely large, almost triangular in form, and are separated from the small lateral incisors by a considerable interval. The most singular part of the dentition is, however, found in the incisors of the lower jaw, of which Van der Hoeven speaks as follows:—"The two middle incisors of the lower jaw are small, narrow, placed between two long conical, *hollowed on the inside by a deep groove;* the second grooved incisor of the lower jaw distinguishes this genus from all the others of which the dental system is known hitherto."—*Handbook of Zoology*, vol. ii. p. 727.

DAESMAN.—*Galemys pyrenaica.*

The dentition of the Agouta would seem to indicate that the creature was insectivorous in its diet, but Mr. Hearne, who possessed one of these animals in a living state, remarks that its food is chiefly grain, although it is also capable of eating animal food. In general appearance the Agouta somewhat resembles the barn-rat of England, and might easily be mistaken for that animal if seen while in motion, and for a short time only. There is supposed to be but one species of this curious genus. The generic name, Solenodon, is of Greek origin, and signifies channel-toothed.

ALTHOUGH the water shrew has earned for itself its aquatic title, it is not nearly so constant an inhabitant of the water as the DAESMAN or DESMAN, an animal whose very form is sufficient to stamp it as a creature that lives almost exclusively in the water. A casual glance at the external formation of the Daesman will at once pronounce the animal to be made for swimming and diving, and its admirable adaptation for aquatic evolutions is more evident as the structure of the creature is more closely examined.

A VERY remarkable animal now comes before us, the BULAU, TIKUS, or GYMNURA, as it is indifferently termed.

This creature, which is an inhabitant of Malacca and Sumatra, bears no slight external resemblance to the opossum of America, the similarity being increased by its long and harsh hair, and the long scaly tail, sparely furnished with very short hairs. The generic name, Gymnúra, is derived from two Greek words signifying naked tail, and is, therefore, very appropriately applied to this animal. All the feet are terminated by five toes, the three middle toes being longer than the others. The muzzle is much lengthened, but is cut off rather abruptly at its termination. The eyes are small in proportion to the dimensions of their owner, and the ears are small, rounded, and devoid of hairy covering.

One distinguishing peculiarity of the animal is, that the fur which covers the body and head is pierced by a number of very long bristling hairs, that project for a considerable distance from the body, and are much longer on the neck and shoulders than on any other portion of the body. The color of the creature is a rather peculiar mixture of black and white, which are arranged as follows: the greater part of the body, the upper portion of the legs, and the beginning of the tail, are black; while the head, the neck, and flanks, and the remainder of the tail, are white. There is also a black stripe over each eye, which forms a bold contrast with the white fur of the head.

HEDGEHOG.—*Erinaceus europaeus.*

Like the preceding animals, the Bulau is possessed of glands which secrete a substance of a powerful musky smell. For the introduction of this animal to science we are indebted to Sir Stamford Raffles, who brought it from Sumatra, and, taking it for one of the viverrine animals, described it under the name of Viverra gymnura.

The Hedgehog finds representatives in many parts of the world, which seem to be possessed of the same propensities, whether they are found in England, in India, or in Africa.

There are several species of this curious animal, which are remarkable for two or three peculiarities of form and habit.

The external characteristic which immediately strikes the attention of the beholder is the formidable array of bristling spines with which the back is more or less covered, and which offers a *chevaux-de-frise* of sharp spikes towards any animal that may present itself as an enemy. Another peculiarity is the power possessed by these creatures of rolling themselves into a round ball, by placing the head on the breast, drawing up the legs, and curling the body firmly round these members. By this posture, the Hedgehogs render themselves invulnerable to almost every animal that may attack them, and defend the legs, abdomen, and other portions of the body that are left unprotected by nature. When in this curious attitude, the Hedgehog cannot be unrolled by main force, as long as any life remains in the body, for there is an enormously developed muscle, with a very thick margin, which spreads over the back and round the sides, and which, when contracted, holds the creature in so firm an embrace that it will be torn in pieces rather than yield its point.

The technical name of this muscle is *pannículus carnósus*, and it is by means of this muscle that bears and other animals are able to shake their skins when they are irritated by any substance that clings to the hair, and which they cannot reach with their teeth.

The Hedgehogs are plantigrade in their gait, and, like the generality of plantigrade animals, are not particularly active or rapid in their movements. Although they generally prefer a deliberate pace when they are not alarmed or hurried, they can get over the ground with no small speed when they feel themselves called upon to make such an exertion.

The feet of the Hedgehog are furnished with five toes, those of the fore-feet terminated with tolerably strong claws, which, although not so evidently fossorial as those of the moles and other insectivorous animals, are yet very capable of digging, and are used effectually for that purpose. The soles of the feet are naked. The limbs and the entire under surface of the body are undefended by the stiff prickles which are so thickly set upon the back, and are clothed with hair of a more or less dense character, according to the particular species. In every species, however, the hair is of a peculiar character, and is intermixed with a goodly number of tolerably stiff hairs of a bristly character.

The food of the Hedgehog consists chiefly of insects, worms, snails, and similar creatures, but it is of essentially carnivorous taste, and is in no wise particular what the kind of food which it eats, provided that it be of an animal character.

These details of form and habit are common to all the Hedgehogs; and the other peculiarities of the Erinacea, as these animals are learnedly named, will be mentioned in connection with the two species that will be figured and described in these pages.

The Long-eared Hedgehog derives its name from the exceeding dimensions of its ears, which project from its head in such a manner as to give to the animal a very porcine aspect. This species is found in Siberia and in all the eastern regions of Asiatic Russia, and has also been captured in Egypt. It is a smaller animal than the common Hedgehog of Europe, but is very variable in its dimensions, according to the locality in which it is found. The limbs are comparatively long and slender, and the long hair that clothes the lower portions of the body is extremely fine in its texture. The array of prickly spines that guard its back does not extend so far as in the European species, and are of a rather peculiar coloring. At the base, each spine is marked with a whitish ring, the centre is brown, and the tip is tinted with yellow. The color of the eye is bluish-gray.

The common Hedgehog, Hedge pig, or Urchin, is one of the most familiar of mammalia, being found wherever the country is capable of affording food and shelter to him.

The hard, round spines which cover the upper part of its body are about an inch in length, and of a rather peculiar shape. This form is wonderfully adapted to meet the peculiar objects which the spine is intended to fulfil, as will be seen in the following account.

The spines lie nearly horizontally upon the back of the animal, a position which they assume whenever the Hedgehog chooses to relax the peculiar muscle which governs the spines, and which seems to retain the creature in its coiled attitude. The point of the quill or spine is directed towards the tail. The quill is not unlike a large pin, being sharply pointed at one extremity, and furnished at the other with a round, bead-like head, and rather abruptly bent near the head. If the skin be removed from the Hedgehog, the quills are seen to be pinned, as it were, through the skin, being retained by their round heads, which are acted upon by the peculiar muscle which has already been mentioned.

It is evident, therefore, that whenever the head of the quill is drawn backward by the contraction of the muscle, the point of the quill is erected in proportion to the force which is exerted upon the head, so that when the animal is rolled up, and the greatest tension is employed, the quills stand boldly out from the body, and present the bayonet-like array of points in every direction.

These curiously formed spines are useful to the Hedgehog for other purposes than the very obvious use of protecting the creature from the attacks of its foe. They are extremely elastic, as is found to be the case with hairs and quills of all descriptions, and the natural elasticity is increased by the sharp curve into which they are bent at their insertion into the skin. Protected by this defence, the Hedgehog is enabled to throw itself from considerable heights, to curl itself into a ball as it descends, and to reach the ground without suffering any harm from its fall. A Hedgehog has been seen repeatedly to throw itself from a wall some twelve or fourteen feet in height, and to fall upon the hard ground without appearing even to be inconvenienced by its tumble. On reaching the ground, it would unroll itself, and trot off with perfect unconcern.

The thorn-studded skin of this animal is not without its use even to mankind, and is still employed for various useful purposes.

In some parts of the country it is used in weaning calves, and is an infallible mode of effecting that object. When the farmer desires to wean the young calf, he fixes a Hedgehog's skin upon the calf's muzzle, so that when it goes to suckle its mother it causes such irritation that she will not permit her offspring to approach, and drives it away as often as it attempts to effect its purpose. It is also used in order to cure carriage-horses of the troublesome habit of "boring" to one side while being driven, for when fixed on the pole or the traces it gives the animal such effectual reminders whenever it begins to "bore," that it soon learns to pull straight, and thus to avoid the unpleasant aids to memory that bristle at its side. Even to scientific pursuits the Hedgehog's quills are made to render its services, being used as pins whereby certain anatomical preparations are displayed in spirits of wine, and which are not liable to that provoking rust which is so apt to attack metallic pins when immersed in spirits, and which often render the most elaborate dissections perfectly useless.

Another purpose to which the Hedgehog's skin was formerly applied was the hackling of hemp before it was made up into coarse cloth. This custom was followed by the ancient Romans, but is now obsolete, being superseded by artificial instead of natural combs.

The under surface of the body, together with the limbs, is covered with long bristles and undulating soft hair, which passes rather abruptly into the stiff quills that defend the back, and is so long that it almost conceals the limbs when the animal is walking on level ground. In the adult animal the quills are hard and shining, they thickly cover the entire back and top of the head, and are of a grayish-white color, diversified with a blackish-brown ring near the middle. In the young animal, however, the spines are comparatively few in number, very soft in texture, and nearly white in color, so that for the first few days of their life the little creatures look like balls of white hair.

The tail of the adult Hedgehog is scarcely visible, being hidden by the bristling quills, which exceed its length by nearly one-fourth. In the young animal, however, the tail is apparent enough, as there are, as yet, no quills to conceal it, and it is carried nearly in a line with the length of the body. The total length of a full-grown Hedgehog is rather more than ten inches, the length of the tail being only three-quarters of an inch, and that of the head three inches. The ears are moderately long in their dimensions, being about an inch in length.

The young of the Hedgehog are born about May, and are so unlike the parents that they have been mistaken for young birds by inexperienced observers. It is a very singular fact, and one which is almost if not entirely unique, that not only are they born with their eyes closed, as is the case with kittens, puppies, and many other animals, but with their ears closed also. The soft white quills, which present so curious an appearance as they lie upon the transparent pink skin, very soon begin to deepen in their color, and to increase in number, so that about the end of August the little animals resemble their parents in everything but size. The number of young which are produced at a birth is from three to four.

The nest in which the little Hedgehogs are produced and nurtured is most ingenious in its structure, being so admirably woven of moss and similar substances, and so well thatched with leaves, that it will resist the effects of the violent showers that generally fall during the spring, remaining perfectly dry in the midst of the sharpest rain.

Marching securely under the guardianship of its thorn-spiked armor, the Hedgehog recks little of any foe save man. For, with this single exception, there are, in our land at least, no enemies that need be dreaded by so well-protected an animal. Dogs, foxes, and cats are the only creatures which possess the capability of killing and eating the Hedgehog, and of these foes it is very little afraid. For dogs are but seldom abroad at night while the Hedgehog is engaged in its nocturnal quests after food; and the fox would not be foolish enough to waste its time and prick its nose in weary endeavors to force its intended prey out of its defences. Cats, too, are even less adapted to such a proceeding than dogs and foxes.

It is indeed said that the native cunning of the fox enables it to overreach the Hedgehog, and to induce it to unroll itself by an ingenious, but, I fear, apocryphal process. Reynard is said, whenever he finds a coiled-up Hedgehog, to roll it over and over with his paw towards some runnel, pond, or puddle, and then to souse it unexpectedly into the water. The Hedgehog fearing that it is going to be drowned, straightway unrolls itself, and is immediately pounced on by the cunning fox, which crushes its head with a single bite, and eats it afterwards at leisure. The puma is said to eat the Hedgehog in a very curious manner. Seizing the animal by the head, it gradually draws the animal through its teeth, swallowing the body and stripping off the skin.

Man, however, troubles himself very little about the Hedgehog's prickles, and when disposed to such a diet, kills, cooks, and eats it without hesitation.

The legitimate mode of proceeding is to kill the animal by a blow on the head, and then to envelop it, without removing the skin, in a thick layer of well-kneaded clay. The enwrapped Hedgehog is then placed on the fire, being carefully turned by the cook at proper intervals, and there remains until the clay is perfectly dry and begins to crack. When this event has taken place, the cooking is considered to be complete, and the animal is removed from the fire. The clay covering is then broken off, and carries away with it the whole of the skin, which is adherent by means of the prickles. By this mode of cookery the juices are preserved, and the result is pronounced to be supremely excellent.

This primitive but admirable form of cookery is almost entirely confined to gipsies and other wanderers, as in these days there are few civilized persons who would condescend to partake of such a diet. Utilitarians, however, can render the creature subservient to their purposes by using it as a guardian to their kitchens. Its insect-devouring powers are of such a nature that it can be made a most useful inhabitant of the house, and set in charge of the "black beetles."

It is domesticated without the least difficulty, and speedily makes itself at home, if it be only supplied with a warm bed of rags or hay in some dark crevice. The rapidity with which it extirpates the cockroaches is most marvellous, for their speed and wariness are so great that the Hedgehog must possess no small amount of both qualities in order to destroy them so easily. A Hedgehog which resided for some years in our house was accustomed to pass a somewhat nomad existence, for as soon as it had eaten all the cockroaches in our kitchen it used to be lent to a friend, to whom it performed the same valuable service. In a few months those tiresome insects had again multiplied, and the Hedgehog was restored to its former habitation.

The creature was marvellously tame, and would come at any time to a saucer of milk in broad daylight. Sometimes it took a fancy to promenading the garden, when it would trot along in its own quaint style, poking its sharp nose into every crevice, and turning over every fallen leaf that lay in its path. If it heard a strange step, it would immediately curl itself into a ball, and lie in that posture for a few minutes until its alarm had passed away, when it would cautiously unroll itself, peer about with its little bead-like eyes for a moment or two, and then resume its progress.

From all appearances, it might have lived for many years had it not come by its death in a rather singular manner. There was a wood-shed in the kitchen-garden, where the bean and pea-sticks were laid up in ordinary during the greater part of the year, and it seemed, for some unknown reason, to afford a marvellous attraction to the Hedgehog. So partial to this locality was the creature, that whenever it was missing we were nearly sure to find it among the bean-sticks in the wood-shed. One morning, however, on searching for the animal, in consequence of having missed its presence for some days, we found it hanging by its neck in the fork of a stick, and quite dead. The poor creature had probably slipped while climbing among the sticks, and had been caught by the neck in the bifurcation.

It has just been mentioned that the Hedgehog was in the habit of drinking milk from a saucer, and this fact leads to the prevalent idea that the Hedgehogs are accustomed to suck cows while they are lying on the ground. Naturalists have generally denied this statement, saying, as is true enough, that the little mouth of the Hedgehog is so small that it would not be capable of sucking the cow, and that, even if it could do so, its needle-pointed teeth would be so painful to the cow that she would drive away the robber as soon as she felt its teeth. So far they are quite correct, for both their propositions are undoubtedly true. But, nathless, there is great truth in the assertion that the Hedgehog drinks the milk of cows. I have received several communications on this subject, where my correspondents assert that they have seen the creature engaged in that pursuit, and I have been told by several credible witnesses that they have been spectators of the same circumstance. But in neither case was it asserted that the animal was really sucking the cow, but that it was lying on the ground, lapping up the milk as it oozed from the over-filled udder of the animal before the hour of milking had arrived. Granting this to be a fact, the creature can yet do no real injury to the farmer or the dairyman, as the amount of milk which it thus consumes is very small, and would have been wasted had it not been lapped up by the Hedgehog's greedy tongue.

The Hedgehog is also accused of stealing and breaking eggs, to which indictment it can but plead guilty.

It is very ingenious in its method of opening and eating eggs; a feat which it performs without losing any of the golden contents. Instead of breaking the shell, and running the chance of permitting the contents to roll out, the clever animal lays the egg on the ground, holds it firmly between its fore-feet, bites a hole in the upper portion of the shell, and, inserting its tongue into the orifice, licks out the contents daintily.

Not contenting itself with such comparatively meagre diet as eggs, the Hedgehog is a great destroyer of snakes, frogs, and other animals, crunching them together with their bones as easily as a horse will eat a carrot. Even the thick bone of a mutton-chop, or the big bone of a fish, is splintered by the Hedgehog's teeth with marvellous ease. On one account it is rather a valuable animal, for it will attack a viper as readily as a grass-snake, being apparently proof against the venom of the serpent's fangs. Experiments have been tried in order to prove the poison-resisting power of this strange animal, which seems to be invulnerable to every kind of poison, whether taken internally or mixed with the blood by insertion into a wound.

On one occasion, a Hedgehog was placed in a box together with a viper, and, after a while, began to attack it. The snake, being irritated, rose up, and bit its assailant smartly on the lip. The Hedgehog took but little notice of the incident, but after licking the wounded spot once or twice, returned to the charge. At last it succeeded in killing the viper, and, after having done so, ate its vanquished enemy, beginning at the tail, and so working upwards. The animal always seems to eat a snake in this fashion, and on one occasion was known to proceed with its banquet while the poor snake was still living.

Poisons of all kinds have been tried upon the Hedgehog without the least effect. Prussic acid, arsenic, and other deadly substances have been unsuccessfully administered, and the animal has been known to make a very satisfactory meal on cantharides without experiencing any ill effects from these cauterizing insects. How it is that the constitution of the creature can resist the effects of such powerful substances is not, as yet, known. It is, however, a subject of much interest, and, if it could be elucidated, would probably be of incalculable service to mankind.

On one occasion, when a Hedgehog was employed in the demolition of a snake, it proceeded in a remarkably cautious manner, as if it had been a practised combatant, and had learned how to inflict injury on its foe without suffering in return. On being roused by the touch of the snake, the Hedgehog—which had been coiled up—unrolled itself, bit the snake sharply, and immediately resumed its coiled attitude. Three times it repeated this proceeding, and when after the third bite the snake's back was bitten through, the Hedgehog stood by the side of its victim, and deliberately crushed the snake's body throughout its entire length by biting it at intervals of about half an inch. Having thus placed itself beyond the reach of retaliation, it took the tip of the snake's tail in its mouth, began to eat it, and finished the reptile in the course of twenty-four hours.

The exploits of the Hedgehog in serpent-killing are useful enough in their way, but it too often happens that the carnivorous propensities of the animal are exercised upon less harmful creatures than vipers or other "vermin." Indeed, the poultry-fancier and the game-preserver have too much reason for ranking the Hedgehog itself under that expressive and somewhat comprehensive epithet. Many are the instances on record where the creature has been detected in the act of destroying rabbits, poultry, and various kinds of game, and has been unexpectedly discovered to have been the perpetrator of sundry acts of robbery which had been laid upon the shoulders of the fox, the weasel, or the polecat.

On one occasion, the proprietor of a fine bantam cock was roused by a great disturbance in the place where the fowl was kept, and on going down to see what might be the matter, found his feathered favorite struggling in the jaws of a Hedgehog, which had caught it by the leg and would speedily have devoured it had not its owner come, happily, to the rescue. Again, no less than fifteen turkey poults had been destroyed in the course of a single night, three having been abstracted and the others killed. A number of steel-traps were laid around the scene of devastation, and on the following morning three male Hedgehogs were found in the traps, having evidently returned for the purpose of bringing away the victims of their previous raid.

All kinds of game fall occasional victims to the Hedgehog's appetite, and the partridge, the hare, and the pheasant seem to suffer equally from the voracity of this strange animal. A Hedgehog has been seen in the act of destroying a hare, and had inflicted such injuries that the poor creature died in a very short time after it had been rescued from the jaws of its assailant. Rabbits, too, are frequently eaten by this animal, and Hedgehogs have several times been taken in traps that have been set for other "vermin," and baited with portions of dead rabbits.

That hares, rabbits, and other terrestrial animals should be captured by so apparently clumsy an animal as the Hedgehog is sufficiently remarkable, but that the wary pheasant and the well-winged partridge should fall victims to the creature is more than singular. Yet there are many accredited instances where the Hedgehog has been captured in the very act of killing and eating partridges, and has even been killed while the head of a young partridge still protruded from its mouth. One of these creatures has been detected in the act of eating a hen-pheasant which had been placed in a cage, to which it had gained access by squeezing itself through a marvellously small aperture. Another pheasant had been killed on the previous day, but its death had been laid at the door of the stoat. Earth and air thus seem to furnish their quota of nourishment for the Hedgehog, which extends its depredations to the aqueous element, and displays a cultivated taste for fish. So fond is this carnivorous creature of the finny tribe, that it has been frequently caught in traps which have been baited with fish for the express purpose of decoying the Hedgehog into their treacherous jaws.

Whether in its wild state it is able to capture the little birds, is not accurately known, but in captivity it eats finches and other little birds with great voracity. One of these animals, that was kept in a state of domestication, ate no less than seven sparrows in the course of a single night, and another of these creatures crushed and ate in the course of twenty-four hours more than as many sparrow-heads, eating bones, bill, and neck with equal ease.

Its legitimate prey is found among the insect tribe, of which it consumes vast numbers, being able, not only to chase and capture those which run upon the ground, but even to dig in the earth and feed upon the grubs, worms and various larvæ which pass their lives beneath the surface of the ground. A Hedgehog has been seen to exhume the nest of the humblebee, which had been placed in a sloping bank, as is often the case with the habitation of these insects, and to eat bees, grubs, and honey, unmindful of the anger of the survivors, who, however, appeared to be but little affected by the inroads which the Hedgehog was making upon their offspring and their stores.

According to the generality of writers, among whom we may reckon Mr. White, the immortalizer of Selborne, the food of the Hedgehog is not entirely animal, but is varied with sundry vegetable substances, such as roots, haws, crabs, and other wild fruits. Others deny the vegetable diet of the Hedgehog. In the "Natural History of Selborne," however, we find a very interesting account of the manner in which the Hedgehog devours the roots of the plantain without injuring the leaves, by grubbing with its snout, and biting off the stems, so delicately that the leaves fall untouched. The roots of grasses are also said to form part of the Hedgehog's food.

As might be supposed from the destructive tendency which is, on certain occasions, so strongly developed in the Hedgehog, the animal is a determined fighter whenever it engages in battle, and is capable of inflicting severe wounds with its sharp teeth and powerful jaws. Should several Hedgehogs be confined in one spot, and a stranger be admitted among them, the new-comer will assuredly be forced to fight for his position, and, in all probability, will either kill one of his opponents, or will fall by the teeth of his adversary. In either case the victor becomes a quadrupedal cannibal, and, not satisfied with having destroyed his foe, proceeds to eat him. In such a case, the slain combatant is totally devoured, with the exception of the skin and its prickles, which remain as a token of battle and a trophy of victory.

All Hedgehogs are, however, not endowed with an equal amount of combativeness, but are extremely different in their dispositions. Some are most gentle and retiring in their habits, while others are savage and ferocious to a degree, and seem to be totally devoid of fear, so that they will attack boldly any object which annoys them, perfectly regardless of its character or its size.

The Hedgehog has generally been considered as a dull and stupid animal, incapable of being tamed, and mindful only of its own comfort. Such, however, is really not the case, for when the animal meets with a kind and thoughtful owner, who will try to develop the best feelings of the creature, it proves to be quite affectionate in its character, and will display no small amount of fearless attachment to its master. It would, in all probability, have been better appreciated had it not been, unfortunately, the object of terror or detestation to those who are unacquainted with its habits, and who are either alarmed at its prickly array of quills, or have imbibed certain prejudicial notions concerning its harmful qualities.

It has already been mentioned that the Hedgehog is fond of milk, but it would hardly be imagined that the animal would condescend to partake of strong drink, and that to such a degree that it would be reduced to a state of helpless intoxication. Such, however, is the case, as has been recorded by Dr. Ball of a Hedgehog which he possessed, and to which he admistered a strong potation of sweetened whiskey. The experiment was not made with any intention of injuring the animal, but for the purpose of testing the popular assertion that the creature would thereby be rendered tame. After saying that the intoxicating draught soon showed its power on the animal, Dr. Ball proceeds as follows:—

"Like the beasts that so indulge, he was anything but himself, and his lack-lustre, leaden eye was rendered still less pleasing by its inane, drunken expression. He staggered towards us in a ridiculous, get-out-of-my-way sort of manner; however, he had not gone far before his potation produced all its effects—he tottered, then fell on his side; he was drunk in the full sense of the word, for he could not even hold by the ground. We could then pull him about, open his mouth, twitch his whiskers, etc.—he was unresisting. There was a strange expression in his face of that self-confidence which we see in cowards when inspired by drinking.

"We put him away, and in some twelve hours afterwards found him running about, and, as was predicted, quite tame, his spines lying so smoothly and regularly that he could be stroked down the back and handled freely. We turned him into the kitchen to kill cockroaches, and know nothing further of him."

The home of the Hedgehog is made in some retired and well-protected spot, such as a crevice in rocky ground, or under the stones of some old ruin. It greatly affects hollow trees, wherever the decayed wood permits it to find an easy entrance, and not unfrequently is found coiled up in a warm nest which it has made under the large gnarled roots of some old tree, where the rains have washed away the earth and left the roots projecting occasionally from the ground. Beside these legitimate habitations, the Hedgehog is frequently found to intrude itself upon the homes of other animals, and has been often captured within rabbit-burrows. Perhaps it may be led to these localities by the double motive of obtaining shelter from weather and enemies and of making prey of an occasional young rabbit.

In its retreat the Hedgehog usually passes the winter in that semi-animate condition which is known by the name of hibernation. It, however, lays up no stores, nor, indeed, could it do so, for, as has already been mentioned, its food is almost entirely of an animal nature.

The hibernation of the Hedgehog has lately been denied, because Hedgehogs are occasionally found at large during the winter months. Yet this is no proof to the contrary, for it has already been noticed that the bears are occasionally in the habit of roaming about during the winter, instead of lying motionless in their dens, as is the general custom, yet no one denies the hibernation of the bear in consequence. The subject of hibernation has been most elaborately worked out by Dr. Marshall Hall, who has published the result of his experiments in "Todd's Cyclopædia of Anatomy," and has made many curious observations on the hibernating qualities of the animal which is now under consideration.

In this able dissertation, Dr. Hall warns observers against confounding together the torpor which is produced by excessive cold and that peculiar torpid state which is called hibernation. Indeed, it is always found that although a Hedgehog, or other hibernating animal, will pass into its semi-animate condition at a moderately low temperature, it will be roused at once by severe cold, and will not again resume its lethargy until the temperature be somewhat moderated. "All hibernating animals," he observes, "avoid exposure to extreme cold. They seek some secure retreat, make themselves nests or houses, or congregate in clusters, and if the season prove unusually severe, or if their retreat be not well chosen, and they be exposed in consequence to excessive cold, many become benumbed, stiff, and die."

Those who experiment upon so delicate a subject as hibernation must bear this in mind, and remember also that the least disquieting of the animal will injure the condition under which it sustains its torpidity, even though it should be of so slight a nature as touching the table on which it is placed, or walking with a heavy step across the room. One experimenter, who thought that intense cold was the cause of the torpidity, surrounded a hibernating Hedgehog with a freezing mixture, in the hope of plunging the animal into a more profound sleep. The result, however, was entirely different from his expectation, for the excess of cold first awoke the sleeping animal and afterwards froze it to death.

If the sleeping Hedgehog be touched, or otherwise disturbed, it rouses itself from its lethargy, walks about a little, takes some food, if there should be any at hand, and soon returns to its somnolent condition.

Although unable to contract itself into a ball, after the manner of the true Hedgehogs, the Tanrec, or Madagascar Hedgehog, as it is sometimes called, is closely allied to these animals, and in many respects bears some resemblance to them.

In size, this animal is about the equal of the European Hedgehog, but is rather more elongated in its form, and furnished with longer legs, so that when it walks it does not carry its abdomen so close to the ground, as is the case with the preceding animal. The muzzle of the Tanrec, or Tenrec, as the name is sometimes written, is extremely elongated, rather sharply pointed, and brown in color; the ears are small and rounded, and the tail is absent, a peculiarity which has earned for the animal its specific title of *ecaudátus*, or tailless. The generic name, *Centétes*, or more correctly *Kentétes*, is of Greek origin, and signifies "thorny," in allusion to the short and thorn-like spines with which the body is covered.

The color of the Tanrec is rather variable at different times, on account of the variegated tints which bedeck the array of quills that adorn and defend its back. These quills are black towards their tips, and yellowish towards their bases, so that either tint predominates, according to the arrangement of the quills. In length they are inferior to those of the Hedgehog, the largest not exceeding an inch. The throat, abdomen, and inside faces of the limbs are covered with rather coarse yellowish hairs, and the sides and flanks are decorated with long silken hairs of the same color as the spines.

TANREC.—*Centetes ecaudatus.*

Like the Hedgehog, the Tanrec is a hibernating animal, sleeping for at least three months of the year, secure in the burrow which it has excavated by means of the powerful and crooked claws which are attached to its feet.

Some writers assert that its period of torpidity is during the heat of summer, while others, who have had practical knowledge of the animal and its habits, say that its periodic somnolence takes place during the cold and wintry months. These contradictory accounts can be reconciled by the fact, that the Mauritian winter is from June to November, and that the months which in that island are reckoned as summer months, are winter months with ourselves.

It is not very commonly seen, even in the localities which it most frequents, as it is a nocturnal animal, and, except when under the protection of the shades of night, very seldom leaves the burrow in which it has taken up its residence. The locality which it chooses for its subterranean residence is generally well chosen for the purpose of security, being usually among the old roots of clumps of bamboos, which defend and conceal the entrance, and offer an almost insurmountable obstacle to any foe that might desire to dig the animal out of its den.

The natural food of the Tanrec consists of worms, insects, snails, reptiles, and various similar substances, but the creature will condescend to feed for a time on more sophisticated dainties, such as boiled rice. It is supposed that an unmixed vegetable diet would be very hurtful to the animal's well-being.

Possessed of a most overpowering and unpleasant smell of musk, the Tanrec is not an

Animate Creation.

We have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the ANIMAL WORLD, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an ILLUSTRATED NATURAL HISTORY, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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NOTICE.

As a basis for this new issue we selected the original text of the Rev. Dr. Wood's Work on Natural History, well known as the most fascinating collection of description and anecdote ever published. The editor, Dr. Joseph B. Holder, in making the revision confined it to the abridgment of descriptive matter relating to such European animals as are also represented in a modified form in this country, and amplified Dr. Wood's text descriptive of the American variety. Where the latter are treated, the latest information is added in full and the classification and nomenclature now most approved is adopted.

The classification adopted for the American subjects, is as follows:—

For the Mammals, Prof. Flower, of London Zoological Society; for Birds, Robert Ridgway; Nomenclature of Birds of North America, Smithsonian Publication. Works of Dr. Coues and Baird, Brewer and Ridgway have been freely utilized.

For Fishes and Reptiles, the works of Jordan and Gilbert have proved of great service, well-nigh indispensable.

The Invertebrate Animals having during the last ten years received especial attention from officers of the U. S. Fish Commission, we have availed ourselves of their valuable publications and Yearly Reports. The immense amount of original work done by Prof. Verrill and his assistants in the Commission and the exceptional opportunities for such work accorded naturalists by the courtesy of Prof. Baird, Chief of the Commission, are highly appreciated.

For the very liberal use made of the above-mentioned works, the publisher of this edition would express his grateful acknowledgments.

THE PUBLISHER.

New York, November, 1898.

animal which would be supposed to furnish an agreeable article of diet to any one, except to a starving man in the last extremity of hunger. Yet the natives of Madagascar esteem it among their rarest luxuries, and are so tenacious of this very powerful food, that they can hardly be induced to part with a specimen which they have captured, and which they have already dedicated, in anticipation, to the composition of some wonderful specimen of the cook's art.

The Tanrec is an inhabitant of Madagascar, as may be deduced from its popular title of Madagascar Hedgehog, but has been taken to the Mauritius and there naturalized.

There are other species of the Madagascar Hedgehog, besides the tanrec, among which are recognized the Tendrac, or Spiny Tenrec (*Centétes spinosus*), and the Banded Tenrec (*Centétes madagascarensis*).

The former of these animals is inferior in size to the tanrec, being only five or six inches in length. The color of this animal is rather rich and varied, owing to the deep tinting of the quills and the soft hues of the long and flexible hairs which stud the body intermixed with the quills. The hair is of pale yellow, and the quills are of a deep red or mahogany tint towards their points, and white towards their bases. The long coarse hairs which cover the abdomen and the legs are annulated. This animal is said to be generally found in the neighborhood of water, whether fresh or salt, and to make deep burrows near the bank. The natives esteem it highly as an article of food.

The Banded Tenrec, or Varied Tenrec, as the name is sometimes given, is also a native of Madagascar, and has derived its title of Banded, or Varied, from the bold coloring of the quills and hair.

The general color of the back is a blackish-brown, diversified with three bold stripes of yellowish-white, that afford a strong contrast with the dark ground-hues of the back. The centre one of these stripes extends along the entire length of the animal, and the two others commence by the ear and terminate by the flank. The hair that covers the under portions of the body is of a yellowish-white color.

KANGAROOS, OPOSSUMS, ETC.

The extraordinary animals which are grouped together under the title of Macropidæ, are, with the exception of the well-known opossum of Virginia, inhabitants of Australasia and the islands of the Indian Archipelago.

Many of these creatures, such as the kangaroo, some of the opossums, and the petauristes, are of such singular formation, and so remarkable in their habits of life, that if they had not been made familiar to us through the mediumship of menageries, museums, and the writings of accredited travellers, we should feel rather inclined to consider them and their habits to be but emanations from the fertile brain of some imaginative voyager, who was taking full advantage of the proverbial traveller's licence. Even at the present day, our familiarity with these animals in no way derogates from our wonder at their strange conformation; and the structure of many of them is so complicated, and involves so many considerations, that the study of the Macropidæ and their habits is as yet but little advanced. Anatomists such as Owen, Meckel, John Hunter, and scientific travellers such as Gould, have done much towards clearing up many dubious points in the history of these animals, but the subject is yet comparatively in obscurity, and much remains to be achieved by future zoologists.

Many acknowledged species are known but as "specimens," no accounts of their mode of life, the localities which they most frequent, their food, or their habits, having as yet been given to the world; while it is more than suspected that in many of the vast unexplored portions of Australasia may yet be found numerous species of these animals which are as yet unknown to science, and which will supply many of the links which are needed to complete the system of nature.

There is hardly any practical writer on zoology who does not lament the very incomplete state of our knowledge on this subject; and those who have thrown themselves most zealously into the work, and have achieved the greatest success, have been the most ready to acknowledge the enormous gap that has yet to be filled, and to urge others to prosecute their researches in regions which have as yet been untraversed by the foot of civilized man, and which are the most likely to be the dwelling-places of creatures on which, as yet, an educated white man has never set his eye. Several genera are known to be extinct, and there are interesting accounts of fossil discoveries in Australia, which bring to light the remains of gigantic animals of the same kind as those which now inhabit that country.

So distinct are many of the animals of Australia from those of the Old World, that more than one zoologist has confessed that they seem to be the result of another and a later creation than that by which the animals of the northern hemisphere received their being.

The peculiarity which gives the greatest interest to this group of animals, is that wonderful modification of the nutritient organs, which has gained for them the title of MARSUPIALIA, or pouched animals—a name which is derived from the Latin word *marsupium*, which signifies a purse or pouch. This singular structure is only found in the female Marsupials, and in them is variously developed according to the character of the animal and the mode of life for which it is intended.

The more minute details concerning the marsupium, or pouch, will be found in the course of the work in connection with the particular species to which it belongs, but the general idea of that structure is much as follows:—

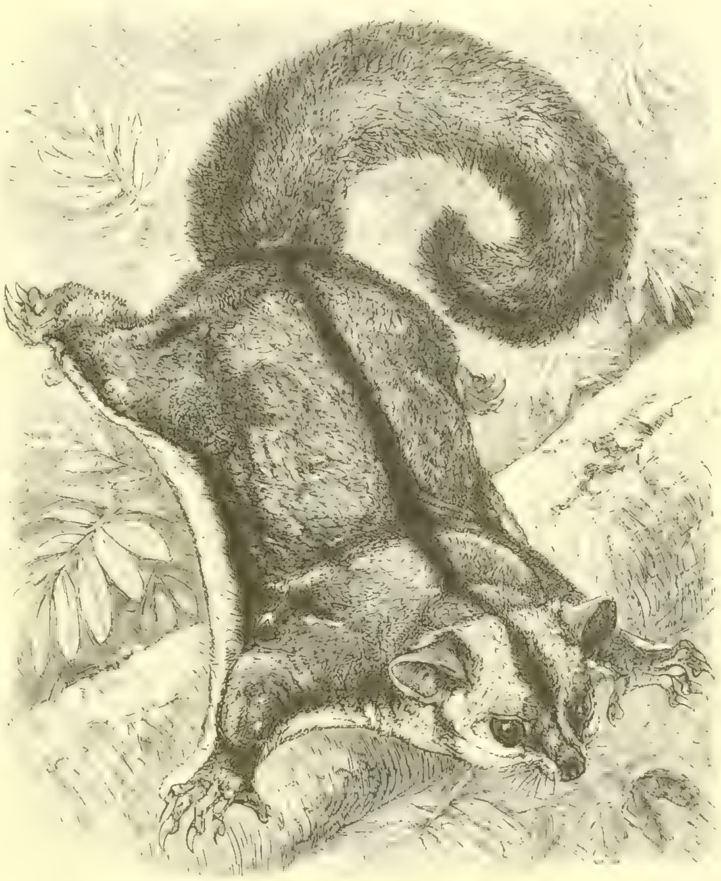
The lower part of the abdomen is furnished with a tolerably large pouch, in the interior of which the mammæ, or teats, are placed. When the young, even of so large an animal as the kangaroo, make their appearance in the world, they are exceedingly minute—the young kangaroo being only an inch in length—and entirely unable to endure the rough treatment which they would meet with were they to be nurtured according to the manner in which the young of all other animals are nourished. Accordingly, as soon as they are born, they are transferred by the mother into the pouch, when they instinctively attach themselves to the teats, and there hang until they have attained considerable dimensions. By degrees, as they grow older and stronger, they loosen their hold, and put their little heads out of the living cradle, in order to survey the world at leisure. In a few weeks more they gain sufficient strength to leave the pouch entirely, and to frisk about under the guardianship of their mother, who, however, is always ready to receive them again into their cradle if there is any rumor of danger; and if any necessity for flight should present itself, flies from the dangerous locality, carrying her young with her.

In some of the Marsupials the pouch is hardly deserving of the name, being modified into two folds of skin, so that the mother is obliged to find other means of carrying her young from place to place. In the structure of the animal there is an admirable provision for sustaining the pouch and its contents, and preventing it from exerting too painful a "drag" upon the skin and walls of the abdomen. Two supplementary bones, called, from their position in the pouch, the marsupial bones, issue from the pelvis, and are directed forward almost parallel to the spine. On account, however, of the method in which certain muscles wind round the marsupial bones, and taking into consideration the fact that these structures are found in both sexes, Mr. Owen considers that their chief aim is not so much in affording support to the pouch as in compressing the numerous glands, so as to aid the feeble young in gaining nourishment.

We will now leave their general consideration, and proceed to examine some of the principal species which are contained in this wonderful group of animals.

AT the head of the Macropidæ are placed a small but interesting band of marsupial animals, which are called Phalangistines, on account of the curious manner in which two of the toes belonging to the hinder feet are joined together as far as the "phalanges." The feet are all formed with great powers of grasp, and their structure is intended to fit them for procuring their food among the branches of the trees, on which they pass the greater portion of their existence.

These creatures fall naturally into three subdivisions—namely, the Petaurists, or those which are furnished with a parachute-like expansion of the skin along the flanks, much resembling a similar structure in the colugo, or flying lemur, which has been already described; the Phalangists, or those which are devoid of the parachute, and are furnished with a long prehensile tail; and the Koalas, or those which are devoid of both parachute and tail. According to many excellent authorities, these three subdivisions are, in fact, three genera, which comprise the whole of the Phalangistines, and which render any further separation into genera entirely unnecessary.



SUGAR SQUIRREL, OR SQUIRREL PETAURUS.—*Petaurus sciureus.*

The animal which is represented in the accompanying engraving is known by several popular names, the most common of which is the SUGAR SQUIRREL. It is also called the NORFOLK ISLAND FLYING SQUIRREL, and the SQUIRREL PETAURUS.

It is only sixteen inches in total length, of which measurement the tail occupies one moiety.

The fur of the Sugar Squirrel is very beautiful, being of a nearly uniform brownish-gray, of a peculiarly delicate hue, and remarkably soft in its texture. The parachute membrane is gray above, but is edged with a rich brown band, and a bold stripe of blackish-brown is drawn along the curve of the spine, reaching from the point of the nose to the root of the tail. The head is somewhat darker than the rest of the body. The under parts of the body are nearly white.

Its long and bushy tail is covered with a profusion of very long, full, soft hair, grayish-brown above, and of a beautiful white underneath. The extremely long tail with which these animals are furnished appears to be of exceeding service to them in balancing their bodies as they make their desperate leap through space, and may also be useful in aiding them to modify the original direction of their sweep through the air.

This supposition is strengthened by the fact, that many long-tailed animals employ that member for the same purpose when they are perched in any critical position where an accurate balance is needful. I have seen a large spider-monkey employ her long prehensile tail for the same purpose. She was seated upon a loose horizontal cord, holding as usual by her hands and tail. But when I gave her an apple, she removed both her hands from the cord, grasping it firmly with her hinder feet, and then permitted her tail to hang its full length, so that she could balance herself by swinging it from side to side, according to the necessity of the moment.

This was the more remarkable, as the animal is noted for the pertinacity with which it grasps any neighboring object with its tail, and never likes to move without securing itself by its tail to the various objects as it goes along, or even to the string by which it is led.

The Sugar Squirrel, like the other Petaurists, is a nocturnal animal, and is seldom seen in the daytime. During the hours of daylight it remains concealed in one of the hollow branches of the enormous trees that grow in its native country, and can only be detected in its retreat by the marvellous organs of vision with which the native Australians are gifted. As soon as evening comes on, the Sugar Squirrels issue from their darksome caverns, and immediately become very frolicsome, darting from tree to tree, and going through the most extraordinary and daring evolutions with admirable ease.

It seems to be a gamesome little animal, and fond of the society of its own species, although it does not appear to respond very readily to the caresses or advances of human playfellows. Being fond of society, the Sugar Squirrels associate in small companies as soon as they emerge from their retreats, and thus are enabled to enjoy their graceful pastime to their hearts' content. Any cage, however, must be most annoying to these active little creatures, who are accustomed to sweep through very considerable spaces in their leap. Mr. Bennet remarks, that the Sugar Squirrel has been known to leap fairly across a river forty yards in width, starting from an elevation of only thirty feet.

Even in captivity they retain their playfulness, and as soon as night brings their expected day, they awake from the heavy lethargy which oppresses them during the hours of light, and uncoiling themselves from the very comfortable attitude in which they sleep, they begin to be very lively, and to traverse their cage with great agility, chasing one another about their residence, and leaping as far as the confined space will permit them.

In climbing and leaping, as well as in grasping the branches towards which they aim their flight, the creatures are greatly aided by the manner in which the thumb of the hinder feet is set on the foot, so as to be opposable to the others, thus enabling the creature to clasp the branches in the same manner as the quadrumana.

THE beautiful little animal which has been called by the expressive name of ARIEL, is about the size of a small rat, and in the hue of the upper portions of the body is not unlike that animal.

The color of the fur upon the upper portions of the body is a light brown, which darkens considerably upon the parachute membrane. On the under surface it is white, the white fur just turning over the edge of the parachute, and presenting a pretty contrast with the dark brown color of its upper surface. The tail is nearly of the same color as the body, with the exception of the tip, which is dark. On account of its graceful movements, and the easy undulating sweep of its passage through the air, it has earned for itself the appropriate name of Ariel, in remembrance of the exquisite and tricksy sprite that animates the world-celebrated drama of the "Tempest."

THE TAGUAN, or PETAURIST, is the largest of the Petaurists, and is supposed to be the only species that belongs to the genus Petaurista.

This animal is a native of New Holland, where it breeds in great abundance, although it is seldom seen in a living state by any but the natives. It is, like the rest of its tribe, a nocturnal animal, taking up its residence in the hollows of large decaying trees, and remaining buried in sleep until the evening has set in, and the shades of night extend their welcome veil over its actions. While it is lying buried in sleep in the depths of its arboreal retreat, it is safe from almost any foe except the ever hungry and ever watchful native of New South Wales, whose keen eye is capable of detecting almost anything eatable, however deeply it may be hidden from sight.

A slight scratch on the bark of a tree, or a chance hair that has adhered to the side of the aperture into which the animal has entered, tells its tale as clearly to the black man as if he had seen the creature ascend the tree and enter its domicile. He is even able to gather from the appearance of the scratch and the aspect of the hairs how many hours have elapsed since the animal left the traces behind it, and can conjecture very accurately whether the intended prey is still within its residence, or whether it be away from home. Should the indications prove favorable, the native proceeds to cut little holes in the tree, in which he thrusts his toes and fingers, and ascends the huge trunk as easily as a bricklayer walks up a ladder. Having reached the aperture, he strikes the tree sharply once or twice with the back of the hatchet, so as to learn, by the echo which is returned to the blow, the position of the animal within the hollow. He then rapidly cuts a hole through the tree into the cavity, seizes the concealed animal by its tail, jerks it out before it has time to use its claws or teeth, dashes it against the tree, and drops it on the ground dead.

It is rather remarkable, that the creature will not emerge from its concealment when awakened by the sound of the axe so near its presence, and is not even induced by the quick jarring of the wooden walls of its habitation to attempt escape from imminent danger. The precaution of jerking the creature quickly from its domicile is most necessary, for the strong, sharp, and curved claws of the animal are formidable weapons when the creature is disposed to use them for combat, and, together with its sharp teeth, can inflict terrible laceration upon its foe. It is of a sufficiently pugnacious disposition, and when it is enraged is a desperate fighter with teeth and claws.

The flesh of the Taguan is said to be very good, and as the animal is a tolerably large one, it is a favorite article of diet among the white and black inhabitants of the country. It is, however, so extremely difficult of capture, that, without the assistance of native aid, the white men would seldom be able to make a dinner on this creature. But as travellers or hunters are generally accompanied by one or more "black fellows," they are well supplied with Taguans by the quick eye and ready hand of their sable allies.

In color the Taguan is extremely variable, but the general arrangement of its color is as follows:

The back is of a rather deep blackish-brown, darker or lighter in different individuals, the feet and muzzle are nearly black, and the under surface of the body and membrane is white. The upper surface of the parachute membrane is rather grizzled, on account of the variegated tints of black and gray with which the hairs are annulated. Many varieties, however, of color exist in the animal, and there are hardly any two specimens in which the tints are precisely alike. The brown hue of the fur is in some examples deepened into a rich black-brown; others are almost entirely gray on the upper surface of the body and parachute membrane; while specimens of a beautiful white are not of very unfrequent occurrence. In all cases, however, the fur of the under portions, and inner faces of the limbs, preserves its white hue.

The whole of the fur is extremely long, being no less than two inches in length on the back. It is very soft and silken in texture, and is remarkably loose and glossy, so that it waves in the air at every movement of the animal, or at the touch of every breath of wind that may stir the atmosphere. On the tail the hair is remarkably long and bushy, and gradually deepens in color from a pale brown at the base to a dark, blackish-brown at the tip.

The animal is found inhabiting the vast forest ranges that run from Port Philip to Moreton Bay, and is seldom, if ever, found in any part of the country except in the eastern or southeastern districts of New South Wales.

The food of the Taguan consists of leaves, buds, and the young shoots of trees, chiefly of the eucalypti, which it eats only during the hours of night. It seldom troubles itself to descend to the ground, for it can easily pass from one tree to another by means of the wonderful apparatus with which it is gifted, but when it does come to earth, prowls about in search of some vegetation that may afford an agreeable variety to the too uniform diet of leaves and buds.

THE HEPOONA ROO, OR GREAT FLYING PHALANGER, is rather a remarkable animal in appearance. It is an inhabitant of New Holland, and is found in tolerable plenty about Port Jackson and Botany Bay.

The color of the Hepoona Roo is rather variable, but is generally as follows. The upper part of the body is brown, tinged with gray, and a much darker brown stripe runs along the course of the spine. The head is darker than the general hue of the body, and on the top of the head the brown tint is warmed by the admixture of hairs of a fawn color. The under portions of the abdomen and the parachute are white, very perceptibly washed with yellow, a peculiarity which has earned for the animal the title of flaviventer, which has been applied to it by some naturalists. The feet are blackish-brown, and the toes of the hinder limbs thickly supplied with hair. The skin is brown.

The tail of the Hepoona Roo is almost as long as the body, and is heavily covered with long and soft fur of a general brown tint, warming to a reddish rust near its insertion, and darkening into a blackish-brown near its tip.

Sometimes the fur of this animal varies so widely from the color which has just been described, that it can hardly be recognized as the same animal, except by a very careful inspection. In some specimens the back is ashy-gray, and the under portions of a dirty grayish-yellow, while in others the coat is variegated with brown, gray, and white, the only dark spot being the tip of the tail, which still retains its deep brown hue. A similar phenomenon takes place with the weasels, when their hair becomes white during a very sharp winter.

In one or two instances, the fur is totally white, and in such cases it is evident that the animal can only be considered as an albino.

The head of the Hepoona Roo is small, and its large and expressive ears are covered with hair. It is not a very small animal, as the total length is rather more than three feet, the head and body occupying one foot eight inches, and the tail rather exceeding eighteen inches in length.

On account of the wonderful resemblance which exists between the members of the genus Petaurus and the flying squirrels that belong to the family of rodents, the Petaurists have, ever since their discovery, been popularly known by the same title. There seems to be little doubt but that the Petaurists are the representatives of these flying rodents, and that the strange animal creation of Australasia is a kind of repetition of the ideas which formed the animal creation of the older world, but carried out in a different manner and for different purposes.

The animals which form the genus Cuscus, and of which the Spotted Cuscus is a good example, have been separated from their neighbors on account of the structure of the tail, which, instead of being covered with hair, is naked except at its base, and is thickly studded with minute tubercles.

They are inhabitants of the Molucca Islands, Amboyna and New Guinea, and have never been found in New South Wales nor in Van Diemen's Land. The name Cuscus is Latinized from the native term couscous or coëscoës; and the specific term, maculatus, or spotted, refers to the peculiar markings which decorate the fur.

In size the Cuscus is equal to a tolerably large cat, as a specimen of average size will measure about three feet in total length, the tail being fifteen or sixteen inches long, and the head and body about eighteen or nineteen inches. There are, however, several examples where the animal has attained to considerably greater dimensions. It is a tree-loving animal, and is very seldom seen away from the congenial haunts among which it loves to dwell, and for traversing which it is so admirably adapted by nature.

The tail of this creature is remarkably prehensile, and the animal never seems to be content unless this member be twisted round some supporting object. Whenever the Cuscus thinks that it is in danger, or that it may be seen by an enemy, it immediately suspends itself by its tail from a branch, and there hangs, swaying about in the wind among the leaves as if it were some lifeless fruit.

It is said that this curious propensity is turned to good account by any one who wishes to capture a Cuscus without any trouble on his own part except a large amount of patient waiting. When the Cuscus is conscious of the human gaze, and has suspended itself by its tail from a branch, it hangs in counterfeited death until it fancies that the peril is overpast. Nothing will induce the animal to give the least signs of life as long as the eye is not taken from it. According to popular report, for the absolute truth of which I do not vouch, it is said that if the man will steadily keep his eye on the suspended animal, it will hang until its wearied muscles refuse to support the weight of its body, and it drops helplessly to the ground.

The fur of the Cuscus is beautifully soft and silken in its texture, and is of some value for conversion into articles of human attire or luxury, such as cloaks and mantles. The color of the fur is singularly variable, even if the Spotted Cuscus be really a separate species, and still more so if, according to many skilful zoologists, it can only be considered as a single variety.

The ground tint of the Spotted Cuscus is a whitish-gray. Upon this pale tint are scattered very large and bold spots of deep brown, covered with a reddish-chestnut. Sometimes it is almost wholly white, with only one or two small spots scattered sparingly over the body. The tail is yellowish-white. Another specimen will be almost entirely of the darker color, and marked as follows: The shoulders and head of a curious gray grizzle, and the remainder of the body to the tail grayish-white. A number of large angular black spots or patches are so placed upon this pale field, that they communicate with each other, and form a kind of indistinct black pattern on the creature's back. The color of these dark patches is nearly black, and would be so entirely but from a number of white hairs which are seen among the black. These descriptions are taken from actual specimens. Another species, called the Ursine Cuscus, is of a uniform deep brown.

These animals are in some request among the white and the native population of the country which they inhabit, for they not only furnish valuable fur or "peltry," as the skin of these and similar creatures is popularly termed, but also afford nourishment to their captors. The flesh of the Cuscus is thought to be remarkably good by those who have partaken of it, and is said to be quite equal to that of the kangaroo. There is a certain rather powerful and not very agreeable scent that issues from the Cuscus and most of its relations, which does not, however, disqualify the creature from forming a most valued portion of the hunter's dietary. This scent proceeds from some small glands which are situated near the insertion of the tail.

In captivity it is not a particularly interesting animal, being dull and slow in its movements, and seldom exhibiting any energy, except, perhaps, when it ought rather to keep itself quiet. One of these creatures, which had been for some time partially domesticated, was very sluggish and unimpressible in its manner until a companion was placed in the same cage. The two animals immediately became violently excited, attacked each other fiercely, and growled, and scratched, and bit, with infinitely more energy than would have been expected from creatures of such apparently apathetic natures.

These specimens were great water-drinkers, and would eat bread, although they evidently gave the preference to meat, thus confirming the opinion that their diet is naturally of a mixed character.

Passing by the curious little dormouse-like animals which are classed under the genus Dromicia, we arrive at the true Phalangists, the first of which is the Tapoa, or Sooty Phalangist, an animal which has been gifted with its rather dismal title in consequence of the uniform smoky-black color of its fur.

The Sooty Phalangist is tolerably common in Van Diemen's Land, where it is much sought after on account of its skin, which is highly valued by white and black men for the purpose of being manufactured into a soft, warm, and beautiful fur. As with the preceding animal, there is considerable variation in the tint of the coat, some specimens being entirely clothed with a uniform dark, dull, blackish-brown, while the fur of others is warmly tinged with a chestnut hue. The tail of this animal is extremely full, the hair being thick, long, and very bushy, more so than that of the body and limbs. One of the most remarkable points in the coloring of this animal is the fact that the abdomen and the under portions of its body retain the brown hue of the upper portions instead of being covered with the beautiful white or yellowish fur which is found in nearly all the preceding animals. The ears of the Tapoa are rather elongated, and triangular in form, thickly covered with hair on the outside, but naked on their inner faces.

In the structure of this creature a rather peculiar formation is well defined, and as it is one of the distinctive marks by which the genus Phalangista is separated from its neighbors, it is well worthy of notice. The tail is, to all appearance, entirely covered with a heavy coating of thick, long, and loose hair, but if that member be lifted up, so as to expose the under surface, and carefully examined, it will be seen that at the extremity the tail is bare of fur, and that a naked stripe runs for some little distance from the tip towards the base. During the lifetime of the animal, this naked stripe, together with the nose and the soles of the feet, are of a light flesh color.

FOX-LIKE in nature as well as in form, the VULPINE PHALANGIST has well earned the name which has been given to it by common consent. It has also been entitled the Vulpine Opossum, and in its native country is popularly called by the latter of these names.

It is an extremely common animal, and is the widest diffused of all the Australian opossum-like animals. Like the preceding animals, it is a nocturnal being, residing during the day in the hollows of decaying trees, and only venturing from its retreat as evening draws on. The nature of its food is of a mixed character, for the creature is capable of feeding on vegetable food, like the Petaurists, and also displays a considerable taste for animal food of all kinds. If a small bird be given to a Vulpine Phalangist, the creature seizes it in its paws, manipulates it adroitly for a while, and then tears it to pieces and eats it. It is rather a remarkable fact, that the animal is peculiarly fond of the brain, and always commences its feast by crushing the head between its teeth and devouring the brain.

VULPINE PHALANGIST.—*Phalangista vulpina.*

In all probability, therefore, the creature makes no small portion of its meals on various animal substances, such as insects, reptiles, and eggs. As to the birds on which it so loves to feed, it may very probably, although so slow an animal, capture them in the same manner as has been related of the lemurs, viz., by creeping slowly and cautiously upon them as they sleep, and swiftly seizing them before they can awaken to a sense of their danger. It is a tolerably large animal, equalling a large cat in dimensions, and is, therefore, able to make dire havoc among such prey whenever it chooses to issue forth with the intention of making a meal upon some small bird that may chance to be sleeping in fancied security.

The fore-paws of the Vulpine Phalangist are well adapted for such proceedings, as they are possessed of great strength and mobility, so that the animal is able to take up any small object in its paws, and to hold it after the manner of the common squirrel. When feeding, it generally takes its food in its fore-paws, and so conveys it to its mouth. In captivity it does not seem to be a very intelligent animal, even when night brings forth its time of energy, and it but little responds to the advances of its owner, however kind he may be. It will feed on bread and milk, or fruits, or leaves, or buds, or any substance of a similar nature, but always seems best pleased when it is supplied with some small birds or animals, and devours them with evident glee.

The flesh of the Vulpine Phalangist is considered to be very good, and the natives are so fond of it that, notwithstanding the laziness that is engrained in their very beings, except when they are under the influence of some potent excitement, they can seldom refrain from chasing an "opossum," even though they have been well fed by the white settlers. When the fresh body of a Vulpine Phalangist is opened, a kind of camphorated odor is diffused from it, which is probably occasioned by the foliage of the camphor-perfumed trees in which it dwells, and the leaves of which it eats.

The fur of this animal is not valued so highly as that of the Tapoa, probably because it is of more common occurrence, for the color of the hair is much more elegant, and its quality seems to be really excellent. Some few experiments have been made upon the capabilities of this fur, and, as far as has yet been accomplished, with very great success. Good judges have declared that articles which have been made from this fur presented a great resemblance to those which had been made from Angola wool, but appeared to be of superior quality. The hat-makers have already discovered the value of the fur, and are in the habit of employing it in their trade.

The natives employ the skin of the "opossum" in the manufacture of their scanty mantles, as well as for sundry other purposes, and prepare the skins in a rather ingenious manner. As soon as the skin is stripped from the animal's body, it is laid on the ground, with the hairy side downwards, and secured from shrinking by a number of little pegs which are fixed around its edges. The inner side is then continually scraped with a shell, and by degrees the skin becomes perfectly clean and pliable. When a sufficient number of skins are prepared, they are ingeniously sewn together with thread that is made from the tendons of the kangaroo, which, when dried, can be separated into innumerable filaments. A sharpened piece of bone stands the sable tailor in place of a needle. From the skin of the same animal is also formed the "kumeel," or badge of manhood, a slight belt, which no one is permitted to wear until he has been solemnly admitted among the assembly of men.

In its color, the Vulpine Phalangist is rather variable, but the general hue of its fur is a grayish-brown, sometimes tinted with a ruddy hue. The tail is long, thick, and woolly in its character, and in color it resembles that of the body, with the exception of the tip, which is nearly black. The dimensions of an old male are given by Mr. Bennett as follows: Total length, two feet seven inches; the head being four inches in length, and the tail nearly a foot.

THE QUAINT-LOOKING animal which is popularly known by the native name of KOALA, or the AUSTRALIAN BEAR, is of some importance in the zoological world, as its serves to fill up the gulf that exists between the phalangistines and the kangaroos.

It has been well remarked that this creature, arboreal in its habits, and really ursine in its general aspect, is the representative of the sun-bears of the Indian Archipelago, or of the sloths of America. The Koala is nocturnal in its habits, and is not very frequently found, even in the localities which it most affects. It is not nearly so widely spread as most of the preceding animals, as it is never known to exist in a wild state except in the south-eastern regions of Australia.

Although well adapted by nature for climbing among the branches of trees, the Koala is by no means an active animal, proceeding on its way with very great deliberation, and making sure of its hold as it goes along. Its feet are peculiarly adapted for the slow but sure mode in which the animal progresses among the branches by the structure of the toes of the fore-feet or paws, which are divided into two sets, the one composed of the two inner toes, and the other of the three outer, in a manner which reminds the observer of the feet of the scansorial birds and the chameleon. This formation, although well calculated to serve the animal when it is moving among the branches, is but of little use when it is upon the ground, so that the terrestrial progress of the Koalo is especially slow, and the creature seems to crawl rather than walk.

As far as is yet known, its food is of a vegetable nature, and consists chiefly of the young leaves, buds, and twigs of the eucalypti, or gum-trees, as they are more popularly called. When it drinks, it laps like a dog.

It seems to be a very gentle creature, and will often suffer itself to be captured without offering much resistance, or seeming to trouble itself about its captivity. But it is liable, as are many gentle animals, to sudden and unexpected gusts of passion, and when it is excited by rage it puts on a very fierce look, and utters sharp and shrill yells in a very threatening manner. Its usual voice is a peculiar soft bark.

The head of this animal has a very unique aspect, on account of the tufts of long hairs which decorate the ears. The muzzle is devoid of hair, but has the curious property of feeling like cotton velvet when gently stroked with the fingers. There is a naked patch of skin that begins at the muzzle and extends for a small space towards the head, and over the whole of this bare patch the peculiar velvety feeling is exhibited. The upper jaw projects slightly over the lower. The generic name, Phascolarctos, is of Greek origin, signifying "pouched bear," and is very appropriate to the animal. As soon as the young Koala is able to leave the pouch, the mother transposes it to her back, where it clings with its hand-like paws, and remains there for some considerable time.

KOALA, OR AUSTRALIAN BEAR.—*Phascolarctos cinereus.*

It is said by those who have seen the animal in its wild state, that it is truly deserving of the name of Australian Sloth, which has been applied to it because it is able to cling with its feet to the branches after the manner of the sloths, and to suspend itself from the boughs much after the same fashion.

This animal is rather prettily colored, the body being furnished with fur of a fine gray color, warmed with a slight reddish tinge in the adult animal, and fading to a whitish-gray in the young. The claws are considerably curved, and black; and the ears are tufted with long white hairs. In size it equals a small bull-terrier dog, being, when adult, rather more than two feet in length, and about ten inches in height, when standing. The circumference of the body is about eighteen inches, including the fur.

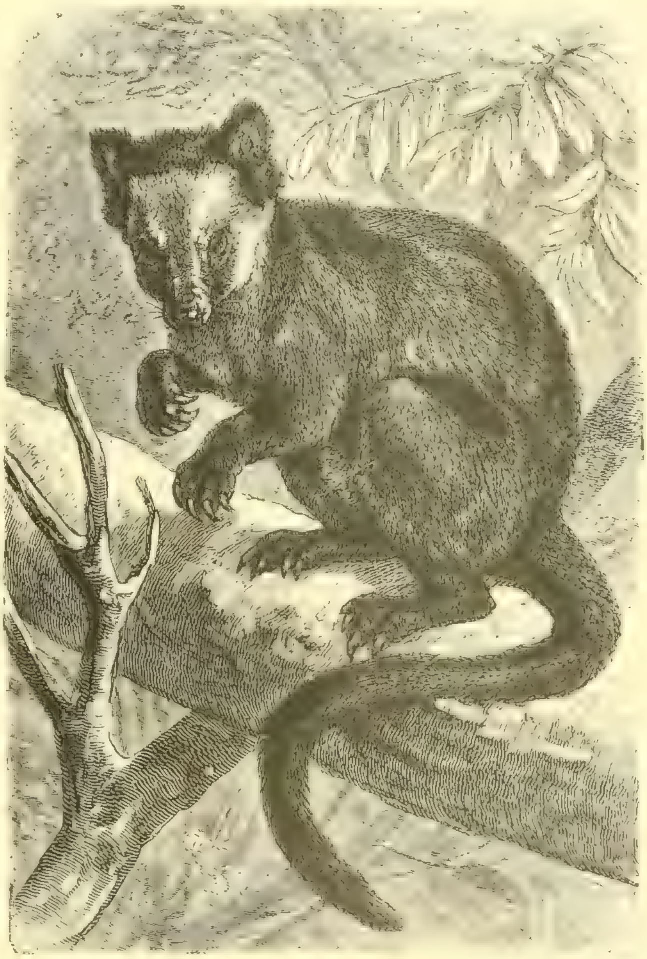
On account of the tree-climbing habits of the Koala, it is sometimes called the Australian Monkey as well as the Australian Bear.

THE animals which come next under consideration are truly worthy of the title of Macropidæ, or long-footed, as their hinder feet are most remarkable for their comparative length, and in almost every instance are many times longer than the fore-feet. This structure adapts them admirably for leaping, an exercise in which the Kangaroos, as these creatures are familiarly termed, are pre-eminently excellent.

First on the list appears the singular animal which is well represented in the engraving, and which, on account of its peculiar habit, is known by the name of the Tree Kangaroo. In general form, this animal is sufficiently Kangaroo-like to be enrolled at once among the members of that group of Macropods, but the comparative shortness of the hinder feet and the length of the fore-feet, together with some peculiarity in the dentition, have induced the later zoologists to place it in a separate genus from the true Kangaroo.

The fur of the Tree Kangaroo is so remarkably dark that its deep tinting serves as an infallible mark of distinction, by means of which it may be recognized even at some distance. It is on account of the dark, glossy blackness of the fur, that the creature is called ursinus, or bear-like, as the hairs of its fur are thought to bear some resemblance to those which form the coat of the American black bear.

The coloring of its fur is generally as follows: the whole of the back and the upper parts of the body are a deep, glossy black, the hairs being rather coarser, and running to some length. These hairs are only of one kind, for in the fur of the Tree Kangaroo there is none of that inner coat of fine, close, woolly hair which is found in the other Kangaroos, and which lies next to the skin. The whole of the fur is, therefore, composed solely of the long and stiff hairs that are usually found to penetrate through the interior covering of woolly fur, and to lie upon its surface. The under parts of the body are of a yellowish hue, and the breast is washed with a richer and deeper tint of chestnut. The tail is of the same color as the body, and is of very great length, probably to aid the animal in balancing itself as it climbs among the branches of the trees on which it loves to disport itself.



TREE KANGAROO.—*Dendrolagus ursinus.*

To see a Kangaroo on a tree is really a most remarkable sight, and one which might well have been deemed a mere invention had it not often been attested by credible witnesses. I have repeatedly seen one of these creatures clambering about a tree-trunk with perfect ease, and ascending or descending with the security of a squirrel. The animal looks so entirely in its wrong place, that when the black-haired, long-legged creature hops unexpectedly upon a tree and hooks itself among the branches, with its long black tail dangling below it, the entire aspect of the animal is absolutely startling, and suggestive of the super—or, perhaps, the infer—natural to the mind of the spectator. This species is not, however, the only one that can ascend trees, an art which is practised with some success by the Rock Kangaroo.

The food of this species consists of vegetable substances, such as the young bark, twigs, berries, and leaves of the trees upon which it lives, but very little is known of its habits in a wild state. It is an inhabitant of New Guinea.

THE BRUSH-TAILED BETTONG, or JERBOA KANGAROO, as it is sometimes called, affords an excellent example of the genus Bettongia, in which are collected a small group of Kangaroos that are easily distinguished by their peculiarly short and broad heads.

In size it equals a common hare, the head and body being about fourteen inches in length, and the tail about eleven inches, without including the tuft which decorates its extremity.

The general color of the animal is a palish brown liberally pencilled with white, and the under parts are of a pale grayish-white. The "brush" is black, and the under side of the tail is brownish-white.

It is a nocturnal animal, and lies curled up during the entire day, issuing forth from its nest as the shades of evening begin to draw on.

The nest of the Brush-tailed Bettong is a very ingenious specimen of architecture, and is so admirably constructed, that it can hardly be detected by an American eye, even when it is pointed out to him. The native, however, whose watchful eye notes even the bending of a leaf in the wrong place, or the touch of a claw upon the tree-trunk, seldom passes in the vicinity of one of these nests without discovering it and killing its inmates, by dashing his tomahawk at random into the mass of leaves and grass.

As this animal resides chiefly on grassy hills and dry ridges, it is no easy matter to make a nest that shall be sufficiently large to contain the female and her young, and yet so inconspicuous as not to attract attention. The manner in which the nest is made is briefly as follows:

The animal searches for some suitable depression in the earth, enlarging it till it is sufficiently capacious, and builds a curious edifice of leaves and grass over the cavity, so that when she has completed her task, the roof of the nest is on a level with the growing grass.

For additional safety, the nest is usually placed under the shelter of a large grass tuft or a convenient bush, so concealed that even the watchful eye of the native can hardly detect the home which only the Brush-tailed Bettong constructs with such ingenuity.

The manner in which the animal conveys the materials of its nest to the spot where they are required is most remarkable. After selecting a proper supply of dried grass, the creature makes it up into a sheaf, and twisting her prehensile tail round the bundle, hops away merrily with her burden.

It is almost impossible to comprehend the extreme quaintness of the aspect which is presented by a Jerboa Kangaroo engaged in this manner without actual experience, or the aid of a very admirable and spirited drawing.

When the animal has completed its nest, and the young are lying snugly in its warm recesses, the young family is effectually concealed from sight by the address of the cautious mother, who invariably drags a tuft of grass over the entrance whenever she leaves or enters her grassy home.

It is an active little creature, and not easily caught even by fair speed, and has a habit of leaping aside when it is hard pressed and jumping into some crevice where it effectually conceals itself.

The Brush-Tailed Bettong is extremely common over the whole of Van Diemen's Land and especially of New South Wales.

The color of the fur is a gray-brown above, and the under parts of the body are of a grayish-white.

The scientific name of the Brush-Tailed Bettong is *Bettongia penicillata*.

THE KANGAROO RAT (*Hypsiprymnus minor*, or *Hypsiprymnus murinus*), is called by the natives POTOROO. It is a native of New South Wales, where it is found in very great numbers.

It is but a diminutive animal, the head and body being only fifteen inches long, and the tail between ten and eleven inches. The color of the fur is brownish-black, pencilled along the back with a gray-white. The under parts of the body are white, and the fore-feet are brown. The tail is equal to the body in length, and is covered with scales, through the intervals of which sundry short, stiff, and black hairs protrude.

Animate Creation.

WE have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the ANIMAL WORLD, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an ILLUSTRATED NATURAL HISTORY, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

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This little animal frequents the less open districts, and is very quick and lively in its movements, whether it be indulging in its native gamesomeness or engaged in the search for food. Roots of various kinds are the favorite diet of the Kangaroo Rat, and in order to obtain these dainties the animal scratches them from the ground with the powerful claws of the fore-feet. It is specially fond of potatoes, and often commits considerable havoc in a kitchen-garden by exhuming and carrying away the seed-potatoes. In retaliation for these injuries the owner of the garden sets traps about his potato-grounds, and by means of baiting them with the coveted roots entices numbers of Potoroos into the treacherous snare.

The movements of the Kangaroo Rats do not in the least resemble those of the Kangaroos themselves, for although they can sit erect upon their hind-legs, they cannot make those vigorous leaps which are so characteristic of the Kangaroos, nor can they manipulate their food with their fore-paws and carry it to their mouth by means of those limbs.

Their gait, especially when chased, is a very curious kind of gallop, very unequal, but tolerably swift.

The Kangaroo Rats are very timid and harmless animals, and when captured or attacked do not kick or make any violent resistance, contenting themselves with expressing their indignation by an angry hiss.

Of the Kangaroo Rat several specimens have been brought alive to America and to Europe, and it has been noticed that they enjoy the life of captivity just as well as that of freedom.

They are not so exclusively nocturnal as many of the preceding animals, and seem to be equally lively by day as by night. When the animal is sitting upon its hinder portions, the tail receives part of the weight of the body, but is not used in the same manner as the tail of the true Kangaroos, which, when they are moving slowly and leisurely along, are accustomed to support the body on the tail, and to swing the hinder legs forward like a man swinging himself upon crutches.

CONSIDERABLY larger than the preceding animal, the KANGAROO HARE may at once be distinguished from it by the hair-covered muzzle which is a distinguishing mark of the genus Lagorchestes.

The color of the coat is very like that of the common hare, but the fur is short, rather hard, and slightly curled. The upper parts of the body are a mixture of black and cream, the sides are tinged with a yellow hue, and the under parts are a grayish-white. The skin is white.

The fore-legs are black, and the fore-feet are variegated with black and white, the hinder feet being of a brownish-white. A buff-colored ring surrounds the eye, and the back of the neck is washed with yellow. It sometimes happens that a light rust-color takes the place of the buff. The tail is of a very pale brownish-gray, like that of the hare.

There is much variety in the tinting of different specimens of this animal, some being of a much redder hue than others.

The Kangaroo Hare inhabits the Liverpool Plains and the greater part of the interior of Australia, to which region it seems to be limited, seldom, if ever, being seen nearer the sea.

It has many hare-like traits of character, such as squatting closely to the ground in a "form," and then sitting, in hopes of eluding notice, until it is roused to active exertion by actual contact. When it once takes to flight, it runs with amazing celerity, and doubles before the hounds in admirable style, not unfrequently making good its escape in the opposite direction by a well-executed "double."

Mr. Gould relates a curious incident that occurred to him while he was engaged in the pursuit of a Kangaroo Hare, attended by two dogs.

The hounds had pressed the animal closely, when it doubled before them, retraced its course at full speed, making directly for Mr. Gould, who was following up his dogs. The animal came within twenty yards without seeing him, and then, instead of turning aside, leaped clear over his head.

The total length of this animal is about two feet, the tail occupying about thirteen inches.

The Kangaroo Hare is not able to dig after the manner of many of the preceding animals.

AMONG the largest of the Macropidæ is the celebrated KANGAROO, an animal which is found spread tolerably widely over its native land.

This species has also been called by the name of *giganteus*, on account of its very great size, which, however, is sometimes exceeded by the woolly Kangaroo. The average dimensions of an adult male are generally as follows: the total length of the animal is about seven feet six inches, counting from the nose to the tip of the tail; the head and body exceed four feet, and the tail is rather more than three feet in length; the circumference of the tail at its base is about a foot. When it sits erect after its curious tripedal fashion, supported by its hind-quarters and tail, its height is rather more than fifty inches; but when it wishes to survey the country, and stands erect upon its toes, it surpasses in height many a well-grown man. The female is very much smaller than her mate, being under six feet in total length, and the difference in size is so great that the two sexes might well be taken for different species.

The weight of a full-grown male, or "boomer," as it is more familiarly called, is very considerable, one hundred and sixty pounds having often been attained, and even greater weight being on record. The color of the animal is brown, mingled with gray, the gray predominating on the under portions of the body and the under-faces of the limbs. The fore-feet are black, as is also the tip of the tail.

Without being truly gregarious, the Kangaroo is seldom seen entirely alone, but in scattered groups of seven or eight in number, and even the members of these little bands are not closely united, but are seen singly disposed at some distance from each other. There are certainly instances on record where very large numbers of Kangaroos have been seen in true flocks, herding closely together, and being under the superintendence of one leader. These animals, however, belong to another species.

As the Kangaroo is a valuable animal, not only for the sake of its skin, but on account of its flesh, which is in some estimation among the human inhabitants of the same land, it is eagerly sought after by hunters, both white and black, and affords good sport to both on account of its speed, its vigor, and its wariness. The native hunter, who trusts chiefly to his own cunning and address for stealing unobserved upon the animal and lodging a spear in its body before it is able to elude its subtle enemy, finds the Kangaroo an animal which will test all his powers before he can attain his object, and lay the Kangaroo dead upon the ground.

There is also another but not so sportsman-like a method of killing the Kangaroo, which is often in use among the aborigines, and which partakes of the nature of a bear "skal" in Norway.

A number of armed men associate themselves together, and, having laid deep counsel about the plan of the hunt, proceed cautiously forward until they come upon a number of Kangaroos. They then silently arrange themselves so as to surround the unconscious animals which are feeding carelessly in the plain. At a preconcerted signal a portion of the hunters issue from their concealment and shower their deadly missiles upon the Kangaroos. The poor alarmed creatures flee from the danger, and are met by another party of the same band, who also ply their spears and clubs with deadly effect. Backwards and forwards run the bewildered animals, assailed on all sides by sharp and heavy missiles hurled by the strong arm and directed by the keen eye of the native hunters; and so well are the plans laid, and with such accurate aim are the deadly weapons thrown, that it seldom happens that a single Kangaroo escapes from the scene of massacre.

A time of feasting then follows, for these wild children of nature have no conception of thrift, and would think themselves very hardly used were they not allowed to eat every particle of food which they could obtain, even though they would be forced to endure the pangs of hunger for many a day afterwards. The quantity of meat that a native Australian will eat at a single meal, and the gallons of water that he will drink, are so astounding as almost to surpass belief.

Besides these modes of hunting, the native makes use of pitfalls, snares, nets, and other devices, by means of which he contrives to entrap the animal without putting himself to the trouble of hunting it.

The white hunters, however, go to work in a very different manner, looking more to the

KANGAROO.

sport than to the number of Kangaroos killed. They are in the habit of breeding and training a certain valuable and peculiar strain of hounds, called, from their quarry, "Kangaroo dogs," and which hunt by sight, like the greyhound. These animals are long, large, and powerful; but, even with all these advantages, are no match for a full-grown Boomer or Forester, as the animal is indifferently called, whenever he chooses to turn to bay and bid defiance to his pursuers.

A very graphic account of a Kangaroo hunt was sent to Mr. Gould, and is published by him in his very valuable monograph on the Macropidæ of Australia. A portion of the letter is extracted, and runs as follows:—

"The 'Boomer' is the only Kangaroo which shows good sport, for the strongest Brush Kangaroo cannot live above twenty minutes before the hounds. But as the two kinds are always found in perfectly different situations, we were never at a loss to find a 'Boomer,' and I must say that they seldom failed to show us good sport.

"We generally 'found' in a high cover of young wattles, but sometimes in the open forests, and then it was really pretty to see the style in which a good Kangaroo would go away. I recollect one day in particular, when a very fine Boomer jumped up in the very midst of the hounds in the 'open;' he at first took a few jumps with his head up, in order to look about him, to see on which side the coast was clearest, and then, without a moment's hesitation, he started forward and shot away from the hounds, apparently without an effort, and gave us the longest run I ever saw after a Kangaroo.

"He ran fourteen miles by the map, from point to point, and if he had had fair play, I have very little doubt but that he would then have beaten us; but he had taken along a tongue of land which ran into the sea, so that, being pressed, he was forced to try to swim across the arm of the sea, which, at the place where he took the water, cannot have been less than two miles broad. In spite of a fresh breeze and a hard sea against him, he got fully half-way over, but he could not make head against the waves any farther, and was obliged to turn back, when, being faint and exhausted, he was soon killed.

"The distance he ran, taking the different bends in the line, cannot have been less than eighteen miles, and he certainly swam two. I can give no idea of the length of time it took him to run this distance, but it took us something more than two hours, and it was evident by the way the hounds were running that he was a long way before us; it is also plain that he was still fresh, as quite at the end of the run he went on the top of a long, high hill, which a tired Kangaroo will never attempt to do, as dogs gain so much on them in going up-hill. His hind-quarters weighed within a pound or two of seventy pounds, which is large for the Van Diemen's Land Kangaroo, though I have seen larger.

"We did not measure the length of the hop of this Kangaroo, but on another occasion, when the Boomer had taken along the beach and left its prints in the sand, the length of each jump was found to be just fifteen feet, and as regular as if they had been stepped by a sergeant."

The Boomer is a dangerous antagonist to man and dog, and unless destroyed by missile weapons will often prove more than a match for the combined efforts of man and beast.

When the animal finds that it is overpowered in endeavor by the swift and powerful Kangaroo dogs, which are bred for the express purpose of chasing this one kind of prey, it turns suddenly to bay, and placing its back against a tree-trunk, so that it cannot be attacked from behind, patiently awaits the onset of its adversaries. Should an unwary dog approach within too close a distance of the Kangaroo, the animal launches so terrible a blow with its hinder feet, that the long and pointed claw with which the hinder foot is armed cuts like a knife, and has often laid open the entire body of the dog with a single blow. Experienced dogs, therefore, never attempt to close with so terrible an antagonist until they are reinforced by the presence of their master, who generally ends the struggle with a bullet. Sometimes, however, the Kangaroo is so startled by the apparition of the hunter that it permits its attention to wander from the dogs, and is immediately pulled down by them.

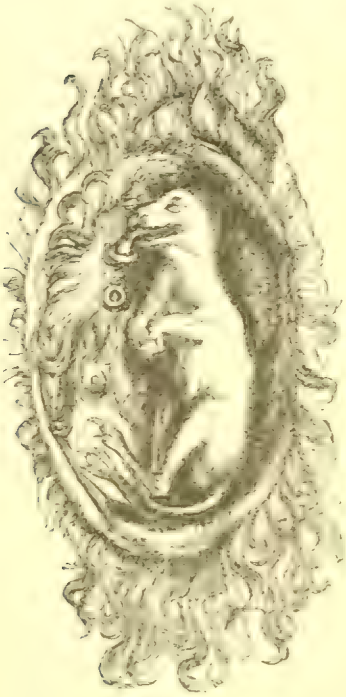
If the hunter should be on foot, he needs beware of the Kangaroo at bay, for the creature is rather apt to dash through the dogs and attack its human opponent, who is likely to fare badly in the struggle unless he succeeds in launching a fatal missile at the advancing animal.

Sometimes the Kangaroo comes to bay near water, and then takes a singular advantage of the situation. If any dog should be bold enough to come within reach, the Kangaroo picks up its foe in its fore-paws, and leaping to the water, holds the dog under the surface until it is dead. On one occasion, a Boomer had come to bay in some shallow water, and was already engaged in drowning a dog, when it was assailed by the remainder of the hounds, which had just arrived. Nothing daunted by their onset, the Kangaroo kept its dying foe under water by holding it down by one of its hind-feet, and held itself prepared to repeat the process upon the next dog that should attack.

But the Kangaroo is wise enough to postpone an actual combat until it is absolutely forced to fight, and uses every stratagem in its endeavors to escape. When pressed very hardly by the hounds, the Boomer has often been known to make a sudden leap at right angles to its former course, and to make good its escape before the dogs could recover themselves. This mode of proceeding is, however, rather a dangerous one, as the animal has more than once broken one of its legs by the sudden strain that is thrown upon the right or left leg, as the case may be.

When running, the creature has a curious habit of looking back every now and then, and has sometimes unconsciously committed suicide by leaping against one of the tree-stumps which are so plentifully found in the districts inhabited by the Kangaroo.

The doe Kangaroo displays very little of these running or fighting capabilities, and has been known, when chased for a very short distance, to lie down and die of fear. Sometimes when pursued, it contrives to elude the dogs by rushing into some brushwood, and then making a very powerful leap to one side, so as to throw the dogs off the scent. She lies perfectly still as the dogs rush past her place of concealment, and when they have fairly passed her, she quietly makes good her escape in another direction. When young, and before she has borne young, the female Kangaroo affords good sport, and is called from her extraordinary speed, the "Flying Doe."



YOUNG KANGAROO IN ITS MOTHER'S POUCH.

The extraordinary pouch in which the young of the Kangaroo and other marsupiated animals are nourished has already been casually mentioned, and as it is highly developed in the Kangaroo, it will be described in connection with this animal.

The young animal when first born is of extremely minute dimensions, hardly exceeding an inch in total length, soft, helpless, and semi-transparent as an earth-worm. After birth it is instantly conveyed into the pouch, and instinctively attaches itself to one of the nipples, which are very curiously formed, being retractile, like the finger of a glove when not in use, and capable of being drawn out to a considerable degree when they are needed by the young animal. In the accompanying engraving this structure is very well delineated.

In this internal cradle the young Kangaroo passes the whole of its earlier stages of development, and when it has attained some little bodily powers occasionally loosens its hold, and pokes its head out of the pouch, as if to see how large the world really is. By degrees it gains sufficient strength to crop the more delicate herbage, and, in course of time, it leaves the pouch altogether, and skips about the plains under the ever watchful protection of its mother. No sooner, however, is the little animal tired, or does the mother see cause of danger, than it scrambles back again into the pouch, and does not emerge until it is refreshed by repose, or until all danger has passed away.

Nearly eight months elapse between the time when the young Kangaroo is first placed in the pouch and the period of its life when it is able to leave the pouch and seek subsistence for itself. Even after it has become too large to continue its residence in its former cradle, it is in the habit of pushing its head into the pouch and refreshing itself with a draught of warm milk, even though a younger brother or sister should be occupant of the living cradle. The little animal weighs about ten pounds when it becomes too heavy for its mother to carry.

This Kangaroo is a very hardy animal, and thrives well in England, where it might probably be domesticated to a large extent if necessary, and where it would enjoy a more genial climate than it finds in many districts of its native land. One of the favored localities of this species is the bleak, wet, and snow-capped summit of Mount Wellington.

At different times of the year the coat of the Kangaroo varies somewhat in its coloring and density. During the summer the fur is light and comparatively scanty, but when the colder months of the year render a warmer covering needful, the animal is clothed with very thick and woolly fur, that is admirably calculated to resist the effects of the damp, cold climate. It is a very singular fact that those specimens which inhabit the forests are much darker in their color than those which live in the plains. The young Kangaroos are lighter in their coloring than their parents, but up to the age of two years their fur deepens so rapidly that they are darker than the old animals. After that age, however, the fur fades gradually, until it finally settles into the grayish-brown of the adult animal.

The eye of the Kangaroo is very beautiful, large, round, and soft, and gives to the animal a gentle, gazelle-like expression that compensates for the savage aspect of the teeth, as they gleam whitely between the cleft lips.

THE largest of the Macropidæ, of which there are already known upwards of eighty species, is the WOOLLY KANGAROO, or RED KANGAROO, as it is more popularly called, on account of its peculiarly tinted fur.

The character of the fur is rather singular, for it does not lie so closely to the body as that of the common Kangaroo, and is of a peculiar texture, which somewhat resembles cotton wool. The hairs are not very long, and their woolly, matted appearance, makes them seem shorter than they really are. The size of this animal is very great, for an adult male measures rather more than eight feet in total length, the head and body being five feet long, and the tail a little short of thirty-eight inches.

By the color of the fur alone the Woolly Kangaroo can be distinguished from its long-legged relatives, independently of other minute differences. The general tint of the fur is of a rusty yellow, changing to gray upon the head and shoulders, the head being washed with a slight brown tint. The sides of the mouth are white, through which protrude a few long, stiff, black hairs, and which are planted in greater numbers over the angle of the mouth, forming an indistinct black patch. The female is distinguished by a broad white mark which runs from the angle of the mouth to the eye. The toes are covered with black hairs.

An ashy-gray tint is seen upon the under portions of the body in the male sex, but in the female these parts are beautifully white. The limbs are grayish-white, washed with rust, and the tail is of the same color as the limbs.

The tail is uncommonly large and powerful, and of vast service to the animal in supporting the heavy frame while the creature is standing erect upon the tripod formed by its hinder feet and its tail. The hairs of the tail are comparatively short and scanty, so that they do not give to the tail that peculiar woolliness which is so distinguishing a characteristic of the creature's fur. It may as well be mentioned in this place that the Kangaroo does not employ the tail in leaping from the ground, but seems to use it partly as a kind of third leg, by which it supports itself when at rest, and partly as a kind of balance, by which it maintains its equilibrium as it leaps through the air.

The muzzle of the Woolly Kangaroo is not so thickly covered with hair as that of the preceding animal. This species is an inhabitant of Southern Australia.

PASSING by the Nail-tailed Kangaroos, so called from the strange nail-like appendage that is found at the extremity of their tails, and which is concealed by the tuft of long black hair which terminates that member, we arrive at the WHALLABEE, or WALLABY, as the word is sometimes spelled.

The genus to which this animal belongs is easily distinguished from the genus Macropus, by reason of the muzzle being devoid of hair. This creature is not nearly so large as the common or the woolly Kangaroo, being only four feet six inches in total length, of which measurement the tail occupies two feet.

The fur of the Whallabee is rather long and coarse in texture, being decidedly harsh to the touch. The color is rather curious, being a darkish-brown washed with a warm rusty hue, and obscurely pencilled with whitish-gray. The whole of the under portions of the body are of a yellowish tint, and the feet and the wrists are quite black. The tail is also rather singular in its coloring, by which it is divided into three nearly equal portions. The dorsal third of the tail is of the same color as the back, but the remaining two-thirds change abruptly from brown to black.

WHALLABEE.—*Halmaturus ualabatus.*

The animal is an inhabitant of New South Wales, and is of tolerably frequent occurrence in the neighborhood of Port Jackson. It is sometimes known by the name of the Aroë Kangaroo. The singular word *ualabatus* has no particular meaning, being only the harsh Latinized form of the native name Whallabee. The genus embraces a considerable number of species, some twelve or thirteen being acknowledged to belong to it.

ONE of the most singular of this singular group of animals is the ROCK KANGAROO, which has derived its popular name from its rock-loving habits.

In the Tree Kangaroo we have already seen a remarkable instance of unexpected powers, and the Rock Kangaroo will shortly be seen to be possessed of equal, if not of superior bodily prowess. The agility with which this animal traverses the dangerous precipices among which it lives is so very great, that when the creature is engaged in skipping about the craggy rocks that shroud its dwelling-place from too vigilant eyes, it bears so close a resemblance to a monkey in its movements, that it has, on many occasions, been mistaken for that active animal. Not only does it resemble the quadrumana in its marvellously easy manner of ascending rocks, but it also emulates those creatures in the art of tree-climbing, being able to ascend a tree-trunk with ease, provided that it be a little divergent from the perpendicular.

By means of its great scansorial capabilities, the Rock Kangaroo is enabled to baffle the efforts of its worst foes, the dingo and the native black man. In vain does the voracious and hungry dingo set off in chase of the Rock Kangaroo, for as soon as the creature has gained the shelter of its congenial rocks, it bounds from point to point with an agility which the dingo can by no means emulate, and very soon places itself in safety, leaving its baffled pursuer to vent its disappointment in cries of rage.

The only method in which the dingo is likely to catch one of these animals, is by creeping unsuspectedly into its den, and seizing it before it can make its escape. Both the dingo and the Rock Kangaroo are in the habit of making their resting-place in some rocky crevice, and it might happen that the Kangaroo might choose too low a domicile, and perchance make choice of the very same crevice that a dingo was about to appropriate to himself. In order, however, to escape such dangers, the habitation of the Rock Kangaroo is generally furnished with two or more outlets, so that its chances of escape are proportionably multiplied.

It is by means of this precaution that the creature baffles the best efforts of the natives. Should a native be fortunate enough to spear a Rock Kangaroo, but not fortunate enough to kill it on the spot, the animal dives at once into its rocky abode, and there awaits its death; for the rocks are too hard to be destroyed by the tools of the aborigines, and if the sable hunter has recourse to fire, and tries to smoke out his intended prey, the smoke rolls harmlessly through the rocky burrow and makes its exit through the various entries, without causing very much inconvenience to the concealed inmate.

It is found that when the Rock Kangaroo comes from its cavernous home, it is in the habit of taking the same route along the rocks, so that by continually passing over the same ground, its sharp and powerful claws make a very visible track over the stones, and afford an infallible guide to the acute sense of the black hunter, who is enabled to follow up the trail and to ascertain the precise crevice in which the animal has taken up its abode.

Generally nocturnal in its habits, the Rock Kangaroo is not seen so often as might be expected, considering the frequency of its occurrence. Now and then, however, it ventures from its dark home and braves the light of day, skipping daintily over the rocky prominences, or lying in the full blaze of the sunlight, and enjoying the genial warmth of the noontide beams. The native and colonial hunters watch eagerly for a basking Kangaroo, for when thus engaged, it is so fully taken up with appreciation of the warm sunbeams, that it can be approached and shot without difficulty. As its flesh is thought to be remarkably excellent, the animal is eagerly sought after by the hunters. It is rather gregarious in its habits, being generally found in little parties of two or three in number.

The color of this animal is rather varied, but is generally of a purplish or vinous gray, which warms into a rich rusty red upon the hind-quarters and the base of the tail. The chest is purplish-gray, pencilled with white, the chin is white, and a very conspicuous white band runs along the throat to the chest. The fur is not in very great repute, as, although long, it is rough and harsh to the touch. The total length of an adult male is about four feet, the tail being about twenty-three inches in length. The tail is furnished with a moderately sized tuft of dark hairs, each hair being about three inches in length, a peculiarity which has earned for the animal the name of Brush-tailed Kangaroo. The body is strong and robust in its form, and the claws of the hinder feet are powerful in their make, as might be expected in an animal of such habits. The feet are so densely covered with fur that the claws are nearly hidden in the thick hairy coat. It is a tolerably hardy animal.

The habitation of the Rock Kangaroo is in the south-eastern portions of Australia, and on account of its peculiar habits it is a very local animal, being restricted to those districts which are furnished with rocks or mountain ranges.

THE WOMBAT, or AUSTRALIAN BADGER, as it is popularly called by the colonists, is so singularly unlike the preceding and succeeding animals in its aspect and habits, that it might well be supposed to belong to quite a different order; indeed, in all its exterior character with the exception of its pouch, it is a rodent animal, and in its internal anatomy it approaches very closely to the beaver.

As might be imagined from its heavy body and short legs, the Wombat is by no means an active animal, but trudges along at its own pace, with a heavy rolling waddle or hobble, like the gait of a very fat bear. It is found in almost all parts of Australia, and is rather sought after for the sake of its flesh, which is said to be tolerably good, although rather tough, and flavored with more than a slight taint of musk. The fur of the Wombat is warm, long, and very harsh to the touch, and its color is gray, mottled with black and white. The under parts of the body are grayish-white, and the feet are black. The muzzle is very broad and thick. The length of the animal is about three feet, the head measuring seven inches.

In its temper the Wombat is tolerably placid, and will permit itself to be captured without venting any display of indignation. Sometimes, however, it is liable to violent gusts of rage, and then becomes rather a dangerous antagonist, as it can scratch most fiercely with its heavy claws, and can inflict tolerably severe wounds with its chisel-like teeth. Easily tamed, it displays some amount of affection for those who treat it kindly, and will come voluntarily to its friends in hopes of receiving the accustomed caress. It will even stand on its hind legs, in token of its desire to be taken on the knee, and when placed in the coveted spot will settle itself comfortably to sleep.

WOMBAT.—*Phascolomys latifrons.*

Generally, however, the Wombat is not a very intelligent animal, and exhibits but little emotion of any kind, seeming to be one of the most apathetic animals in existence. When in captivity it is easily reconciled to its fate, and will feed on almost any vegetable substance, evincing considerable partiality for lettuce-leaves and cabbage-stalks; milk also is a favorite article of diet, and one of these animals was said by Mr. Bennett to be in the habit of searching after the milk vessels when set out to cool in the night air, to push off the covers, and to bathe in the milk as well as drink it.

In its wild state it is nocturnal in its habits, living during the day in the depths of a capacious burrow, which it excavates in the earth to such a depth that even the persevering natives will seldom attempt to dig a Wombat out of its tunnel. Owing to this habit of burrowing, it is very destructive if left in an unpaved yard, for it soon excavates several subterraneous passages, and puts the stability of houses and walls into sad jeopardy.

The creature seems to be remarkably sensitive to cold, considering the severe weather which often reigns in its native country. It is fond of hay, which it chops into short pieces with its knife-edged teeth. The natives say that if a Wombat is making a journey, and happens to come across a river, it is not in the least discomfited, but walks deliberately into the river, across the bed of the stream, and, emerging on the opposite bank, continues its course as calmly as if no impediment had been placed in its way.

The teeth of the Wombat present a curious resemblance to those of the rodent animals, and are endowed with the same powers of reproduction as those of the beaver and other animals of the same order. The feet of the Wombat are broad, and the fore-feet are provided with very strong claws, that are formed for digging in the earth. There are five toes to each foot, but the thumb of the hinder feet is extremely small, and devoid of a claw. This animal is remarkable for possessing fifteen pairs of ribs—in one case sixteen pairs of ribs were found—only six pairs of which reach the breast-bone. Remains of a fossil species of Wombat have been discovered in New Holland, together with the relics of an allied and gigantic species, which, when living, must nearly have equalled the hippopotamus in dimensions.

LONG-NOSED BANDICOOT.—*Perameles nasuta.*

THE BANDICOOT, two examples of which will be described in these pages, form a little group of animals that are easily recognizable by means of their rat-like aspect, and a certain peculiar, but indescribable mode of carrying themselves. The gait of the Bandicoot is very singular, being a kind of mixture between jumping and running, which is the result of the formation of the legs and feet. During progression, the back of the creature is considerably arched. The snout is much lengthened and rather sharply pointed, and the second and third toes of the hinder feet are conjoined as far as the claws. The pouch open backwards.

The BANDED BANDICOOT, or STRIPED-BACKED BANDICOOT, derives its name from the peculiar marking of its fur.

The general color of its coat is a blackish-yellow, as if produced by alternate hairs, the black tint predominating on the back and the yellow on the sides. Over the hinder quarters are drawn some boldly marked black lines, which, when viewed from behind, form a singular and rather pleasing pattern, the dark stripes being made more conspicuous by bands of whitish-yellow. These marks continue as far as the root of the tail, and a single, narrow dark line runs along the whole upper side of the tail, which is of the same color as the body. The fur is rather light upon the head, and the under parts of the body, together with the feet, are white, slightly tinged with gray.

This animal is very widely spread over the eastern and south-eastern parts of Australia, but is mostly found in the interior. It specially loves the stony ridges that are so common in its native land, and although not very often seen by casual travellers, is of very frequent occurrence. Its pace is very swift, and its gait is said to bear some resemblance to that of the pig. Its food is of both kinds, and consists of insects and their larvæ, and of various roots and seeds. Its flesh is held in some repute by natives and colonists.

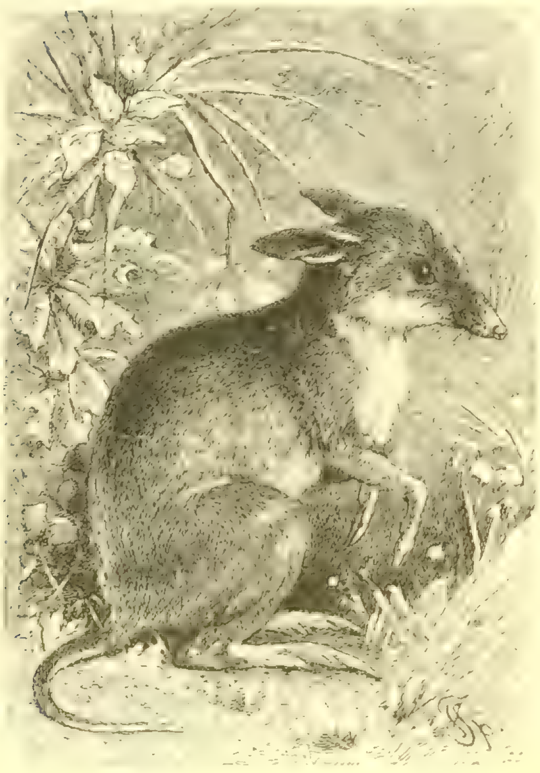
It is but a small animal, measuring only eighteen inches in total length. When the animal is killed, it is not easily flayed, as the skin adheres so tightly to the flesh that its removal is a matter of some difficulty, when there is need for preserving the skin in its integrity.

The Long-nosed Bandicoot is not unlike the preceding animal in form, but differs from it in the coloring of its fur, and the greater length of its snout.

The face, head, and body are of a brown tint, pencilled with black on the upper portions, and the sides are of a pale brown, sometimes warmed with a rich purplish hue. The edge of the upper lip is white, as are also the under portions of the body, and the fore-legs and feet. This fur is very harsh to the touch. The total length of this animal is about twenty-one inches, the tail being five inches in length.

The food of the Long-nosed Bandicoot is said to be of a purely vegetable nature, and the animal is reported to occasion some havoc among the gardens and granaries of the colonists. Its long and powerful claws aid it in obtaining roots, and it is not at all unlikely that it may, at the same time that it unearths and eats a root, seize and devour the terrestrial larvæ which are found in almost every square inch of ground. The lengthened nose and sharp teeth which present so great a resemblance to the same organs in insectivorous shrews, afford good reasons for conjecturing that they may be employed in much the same manner.

The dentition of the Bandicoot is rather interesting, and will be found detailed at some length in the table of generic distinctions at the end of the volume.


CHÆROPUS.—*Chæropus castanotus.*

The large-eared, woolly-furred little animal which is here represented, is closely allied to the bandicoots, but at once distinguishable from them by the peculiarity of structure which has earned for it the generic title of Chæropus, or "swine-footed."

Upon the fore-feet there are only two toes, which are of equal length, and armed with sharp and powerful hoof-like claws, that bear no small resemblance to the foot of a pig, and are not only porcine in their external aspects, but in the track which they leave upon the ground when the creature walks on soft soil. Slenderly and gracefully swinish, it is true, but still piggish in appearance, though not in character.

The Chæropus was formerly designated by the specific title of *ecaudatus*, or tailless, because the first specimen that had been captured was devoid of caudal appendage, and therefore its discoverers naturally concluded that all its kindred were equally curtailed of their fair proportions. But as new specimens came before the notice of the zoological world, it was found that the Chæropus was rightly possessed of a moderately long and somewhat rat-like tail, and that the taillessness of the original specimen was only the result of accident to the individual, and not the normal condition of the species. The size of the Chæropus is about equal to that of a small rabbit, and the soft, woolly fur is much of the same color as that of the common wild rabbit.

It is an inhabitant of New South Wales, and was first discovered by Sir Thomas Mitchell on the banks of the Murray River, equally to the astonishment of white men and natives, the latter declaring that they had never before seen such a creature. The speed of the Chæropus is considerable, and its usual haunts are among the masses of dense scrub foliage that cover so vast an extent of ground in its native country. Its nest is similar to that of the bandicoot, being made of dried grass and leaves rather artistically put together, the grass, however, predominating over the leaves. The locality of the nest is generally at the foot of a dense bush, or of a heavy tuft of grass, and it is so carefully veiled from view by the mode of its construction that it can scarcely be discovered by the eyes of any but an experienced hunter.

The head of the Chæropus is rather peculiar, being considerably lengthened, cylindrically tapering towards the nose, so that its form has been rather happily compared to the neck and shoulders of a champagne bottle. The hinder feet are like those of the bandicoots, and there is a small swelling at the base of the toes of the fore-feet, which is probably the representative of the missing joints, more especially as the outermost toes are always extremely small in the bandicoots, to which the Chæropus is nearly allied. The ears are very large in proportion to the size of the animal. The pouch opens backwards. The food of the Chæropus is said to be of a mixed character, and to consist of various vegetable substances and of insects.

The teeth of the Dasyurines, sharp-edged and pointed, indicate the carnivorous character of those animals to which they belong. At the head of these creatures is placed the TASMANIAN WOLF, or DOG-HEADED THYLACINUS, as it has often been named on account of the curious aspect of its thick head, and powerful, truncated muzzle.

Although not perhaps the fiercest of the Dasyurines, it is the largest and the most powerful, well deserving the lupine title with which it has been by common consent designated, and representing in Tasmania the true wolves of other countries. It is not a very large animal, as needs must be from the nature of the country in which it lives, for there would be but small subsistence in its native land for herds of veritable wolves, and the natural consequence would be that the famished animals would soon take to eating each other in default of more legitimate food, and by mutual extirpation thin down the race or destroy it altogether.

The natural subsistence of the Tasmanian, or Zebra Wolf, as it is sometimes called by virtue of the zebra-like stripes which decorate its back, consists of the smaller animals, mollusks, insects, and similar substances. The animal is also in the habit of prowling along the seashore in restless search of food among the heterogeneous mass of animal and vegetable substances that the waves constantly fling upon the beach, and which are renewed with every succeeding tide. The mussels and other mollusks which are found so profusely attached to the sea-edged rocks form a favorite article of diet with the Tasmanian Wolf, who is sometimes fortunate enough to discover upon the beach the remains of dead seals and fish, and can easily make a meal on the shore crabs which are found so plentifully studding the beach as the tide goes out.

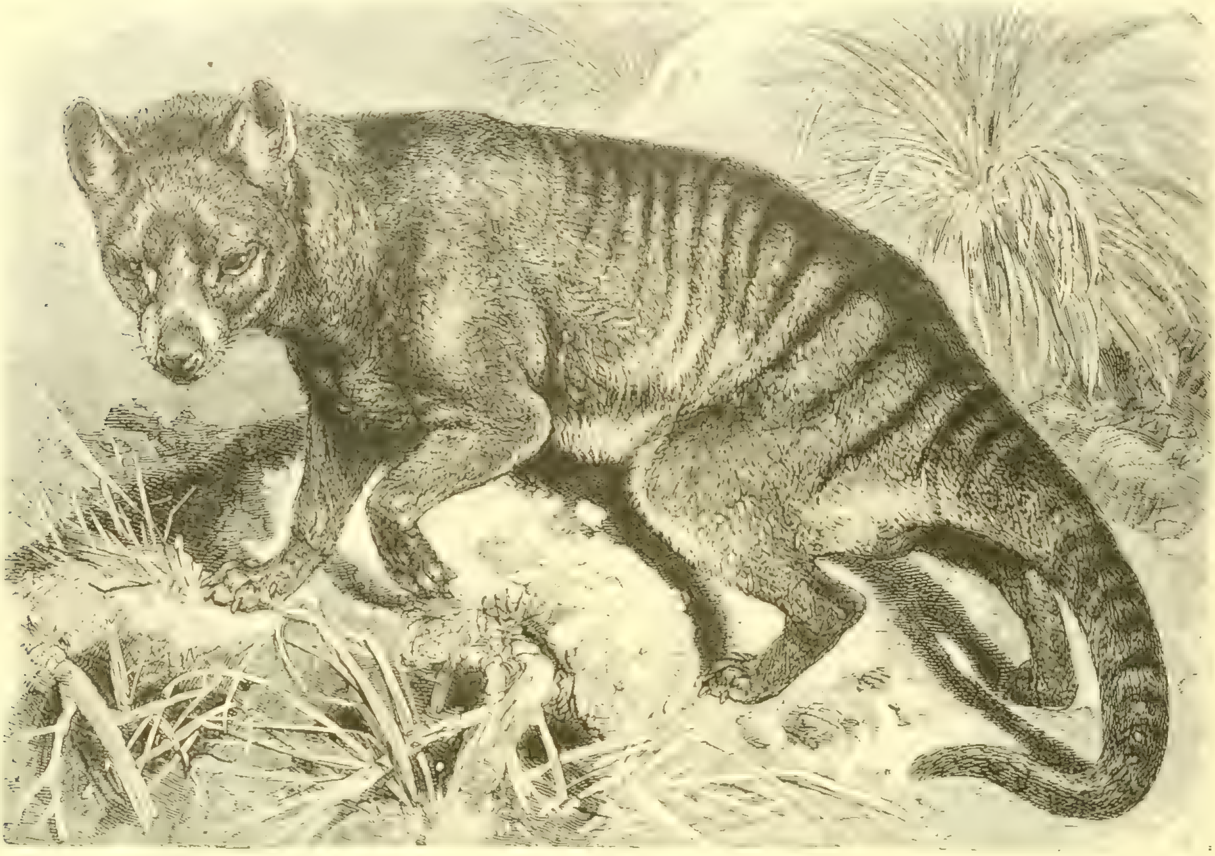
Though hardly to be considered a swift, or even a quick animal, the Tasmanian Wolf contrives to kill such agile prey as the bush kangaroo, and secures the duck mole, or duck bill, in spite of its natatory powers and its subterranean burrow. When the animal is hungry it seems to become a very camel in its capability of devouring hard and thorny substances, for it has been known to kill—no easy matter—and to swallow—an apparent impossibility—the echidna itself, undismayed by its panoply of bayonet-like prickles. The deed seems so incredible that it would hardly have been believed, had it not been proved beyond doubt by the slaughter and subsequent dissection of a Tasmanian Wolf, in whose stomach were found the remains of a half-digested echidna.

As soon as civilized inhabitants took up their abode in Tasmania, this animal made great capital out of the sheep flocks and hen-roosts, and for some time committed sad ravages among them, greatly to the detriment of the colonists. By degrees, however, the weapons of the white man prevailed, and the Tasmanian Wolf was driven back from its former haunts, where it once reigned supreme. Still continuing to prowl round the habitation of mankind, many individuals of this species were fain to pick up what loose and uncertain subsistence they could contrive to appropriate, and, being forced to live in copses and jungles, became the representatives of the hyena as well as of the Wolf.

In the earlier days of the colony, the Tasmanian Wolf was of very frequent occurrence, but is now seldom seen except in the cold and dreary localities where it takes up its residence.

These animals are found in considerable numbers on the summits of the western mountains, at an elevation of nearly four thousand feet above the level of the sea, and there thrive, even though their lofty domains are plentifully covered with snow.

The home of the Tasmanian Wolf is always made in some deep recess of the rocks, away from the reach of ordinary foes, and so deeply buried in the rocky crevices that it is impenetrable to the light of day. In this murky recess the female produces her young, which are generally three or four in number, and in its dark cavern the animal spends the whole of its day, only venturing from home at night, except under the pressure of some extraordinary circumstances.


TASMANIAN WOLF.—*Thylacinus cynocephalus.*

As may be seen from the engraving, the feet of the Tasmanian Wolf are so dog-like in their nature that they cannot enable the animal to ascend trees, and as the tail is not in the least degree prehensile, it is evident that the creature is not capable of chasing its prey among the branches, as is the case with many of the allied animals.

In size it is about equal to the jackal, being generally about four feet in total length, of which measurement the tail occupies some sixteen inches. Some few specimens, however, are said to attain a very great size, and to measure nearly six feet in total length. Its height at the shoulders is about eighteen or nineteen inches. It is a fierce and most determined animal, and if attacked will fight in the most desperate manner. One of these animals has been seen standing at bay, surrounded by a number of dogs, and bidding them all defiance. Not a single dog dared venture within reach of the teeth of so redoubtable a foe.

As it is a nocturnal animal, it seems little at its ease when in the uncongenial glare of daylight, and, probably on account of its eyes being formed for the purpose of nocturnal light, is very slow in its movements by day. It always seems to be greatly annoyed by too strong a light, and constantly endeavors to relieve itself from the unwelcome glare by drawing the nictitating membrane over its eyeballs, after the manner of owls when they venture forth by daylight.

The animal is a very conspicuous one, on account of the peculiar coloring of its fur and the brightly defined stripes which decorate its back.

The general tint of the fur is a grayish-brown, washed with yellow, each hair being brown at its base and yellow towards the point. Along the back runs a series of boldly defined stripes, nearly black in their color, beginning just behind the shoulders and ending upon the base of the tail. The number of these stripes is various, being from fourteen to seventeen on an average. At the spot where they commence they are very short, but lengthen rapidly as they approach the tail, reaching their greatest length over the haunches, over which they are drawn to some extent. In many specimens the stripes are forked upon the haunches. Towards the tail the stripes again become short, and upon the base of the tail are so abbreviated that they only cover its upper surface. The under parts of the body are gray. The tail is slightly compressed, and gradually tapers to its extremity. The eyes are large and full, and their color is black. The edge of the upper lip is white.

TASMANIAN DEVIL.—*Diabolus ursinus.*

In this animal the marsupial bones are absent, their places being indicated by some fibrous cartilages that are found in the locality which these bones might be expected to fill. The character of the fur is not very fine, but it is short, rather woolly, and closely set upon the animal's skin. In front of the eye there is a small black patch, which runs round the eye, and surrounds it with a dark line.

As may be imagined, from the very expressive name which has been appropriated to the animal which is represented in the engraving, its character is not of the most amiable, nor its appearance the most inviting.

Few animals have deserved their popular titles better than the creature to whom the first colonists of Van Diemen's Land unanimously gave the name of Native Devil. The innate and apparently ineradicable ferocity of the creature can hardly be conceived except by those who have had personal experience of its demeanor. Even in captivity its sullen and purposeless anger is continually excited, and the animal appears to be more obtuse to kindness than any other creature of whom we have practical knowledge. Generally, a caged animal soon learns to recognize its keeper, and to welcome the hand that supplies it with food; but the Tasmanian Devil seems to be diabolically devoid of gratitude, and attacks indiscriminately every being that approaches it.

I have frequently had opportunities of testing the character of this curious animal, and have always found it to be equally savage and intractable. Without the least cause it would fly at the bars of its cage, and endeavor by dint of teeth and claws to wreak its vengeance on me, while it gave vent to its passionate feelings in short, hoarse screams of rage. There was no reason for these outbursts of anger, for the animal behaved in precisely the same manner whenever any visitor happened to pause in front of its domicile.

It is a very conspicuous animal, and not easily to be mistaken for any other species. The coat of the Tasmanian Devil is very appropriately black, dashed here and there with spots, patches, or stripes of a pure white, which afford a bold and singular contrast to each other. In different individuals there is considerable variety in the distribution of these two colors, but the character of the markings is similar in all.

The general hue of the fur is a deep, dead black, the fur being devoid of that rich, silky glossiness which gives to the coats of many black animals so pleasing an effect. Across the breast there is nearly always a very conspicuous white mark, which in some individuals takes the form of a semilunar band, and in others is contracted to a mere spot. Generally, another white mark is found to extend saddlewise across the end of the spine, just before the insertion of the tail. This mark is also susceptible of great variation, being of considerable dimensions in some specimens, and extremely small in others. Now and then a white streak or patch is seen upon the shoulders, but in many individuals the shoulders are of equal blackness with the remainder of the body. Behind the eyes is a tuft of very long hairs, and another similar tuft is placed immediately above them.

As might be presumed from the heavy make of its body, and the thickset shortness of its limbs, the animal is not at all brisk or lively in its movements, and seldom displays much energy except when under the influence of the easily-excited irascibility for which it is so widely renowned. The head is short and thickly made, the muzzle very blunt, and the mouth wide. The gait of the animal is plantigrade, and its movements are in general dull and sluggish.

The length of this animal is about twenty-one inches, exclusive of the tail, which measures about seven inches in length, and is moderately well covered with fur.

Despite its comparatively small size, this creature is hardly less destructive than the Tasmanian wolf, and in the earlier days of the colonists wrought sad havoc among the sheep and poultry, especially among the latter. In those days it swarmed in great numbers, but it is now nearly extirpated out of some districts, and is so persecuted by the righteous vengeance of the farmers, that a solitary specimen can scarcely now be seen in the locality where its nightly visits used to be of continual occurrence. Many of these depredators were shot, caught in traps, or otherwise destroyed, and suffered a poetical justice in furnishing a meal for those at whose expense they had often feasted.

The flesh of this rather ungainly animal is said to be far from unpleasant, and to have some resemblance to veal.

The traps in which these nocturnal robbers are caught are baited with flesh of some kind, generally with butcher's offal, for the animal is a very voracious one, and is always sensitive to such attractions. Like the Tasmanian wolf—to which animal it is closely allied—it is in the habit of prowling along the sea-shore in search of the ordinary coast-loving mollusks and crustaceans, or in hopes of making a more generous feast on the dead carcases which the tides will sometimes leave upon the beach.

In captivity it will eat almost any kind of food, and is found to thrive well upon bread and milk, with an occasional addition of flesh. When it is indulged in the latter delicacy, it speedily tears in pieces the meat with which it is furnished, and is in nowise baffled by the presence of moderately sized bones, which it can crack with wonderful ease by means of its strong teeth and powerful jaws.

The great power of its jaws, backed by its unreasoning ferocity, which seems to be literally incapable of comprehending the feeling of fear, renders it extremely formidable when attacked. Indeed, there are hardly any dogs, however strong and well trained they may be, which can boast of a victory gained over a Tasmanian Devil in single fight.

It is rather a productive animal, the number of its family being from four to five at a birth. The habitation of this species is ascertained to be made in the depths of the forests, concealed as far as possible from the light of day, which grievously affects the eyes of this, as of all other strictly nocturnal animals.

The pain which is caused to the creature by the unwelcome brilliancy of ordinary daylight is constantly indicated by the ceaseless movements of the nictitating membrane over the eyeball, even when the animal is shrouded in the comparative dimness of a straw-filled den, and shades itself from the glare by crouching in the darkest corner of its cage.

Aided by the strong fossorial claws of the fore-feet, the Tasmanian Devil digs for itself a deep burrow in the ground, or, taking advantage of some natural hollow or crevice, shapes the interior to suit its own purposes. The hinder feet are made in a manner similar to those of the bear, and, like that animal, the Tasmanian Devil is able to sit erect upon its hinder quarters, and to convey food to its mouth by means of its fore-paws, which it uses in a very adroit manner.

This animal is also known under the names of Ursine Dasyure and Ursine Opossum.

Of the animals which have been congregated into the genus Dasyures, four or five species are now admitted to be clearly separated from each other. In color the Dasyures are extremely variable, so much so, indeed, that it is hardly possible to find two individuals of the same species that are marked in precisely the same manner.

In the common Dasyure (*Dasyurus viverrinus*), the general color of the fur is brown, of a very dark hue, sometimes deepening into positive black, diversified with many spots of white, scattered apparently at random over the whole of the body, and varying both in their position and dimensions in almost every individual. In some specimens the tail is washed with white spots similar to those of the body, but in many examples the tail is uniformly dark. In all the Dasyures this member is moderately long, but not prehensile, and is thickly covered with hair; a peculiarity which has caused zoologists to give the title of Dasyure, or hairy-tail, to these animals.

They are all inhabitants of Australasia, the common Dasyure being found numerously enough in New Holland, Van Diemen's Land, and some parts of Australia. The habits of all the Dasyures are so very similar that there is no need of describing them separately. They are all rather voracious animals, feeding upon the smaller quadrupeds, birds, insects, and other living beings which inhabit the same country. The Dasyure is said to follow the example of the two preceding animals, and to be fond of roaming along the sea-coasts by night in search of food.

The Dasyures are all nocturnal animals, and very seldom make voluntary excursions from their hiding-places so long as the sun is above the horizon.

They do not, like the Tasmanian wolf and the ursine Dasyure, lie hidden in burrows under the earth, or in the depths of rocky ground, but follow the example of the Petaurists, and make their habitations in the hollows of decayed trees.

The young of the Dasyures are, like those of all the animals of this order, extremely small. Their number is rather variable, but is usually from four to six. In this species the thumb of the hind-feet is entirely absent.

The Phascogale, or Tapoa Tafa (*Phascogale penicillata*), as it is termed by the natives of the country which it inhabits, affords an excellent example of the little dependence that is to be placed on mere external appearance in judging the character of any living being.

In size, the Phascogale is small, hardly exceeding the house-rat of Europe in dimensions. The total length of this creature is about seventeen inches, the long, widely-formed tail occupying nine inches, if measured to the point of the hairy tuft that decorates its extremity, and seven inches if denuded of its hairy covering.

The fur of this animal is long, soft, and woolly, and lies very loosely upon the skin, so that it is disturbed by every slight breath of air that may happen to pass over its surface. In color it is a soft gray on the upper parts of the body, the head, and the outer faces of the limbs, the under portions of the body being white, and slightly washed with gray. A few black hairs are scattered sparingly over the body. In almost every specimen that has been captured, a dark line is seen to run from the nose towards the base of the skull.

The tail is clothed with fur of the same color as that of the body for one-fifth of its length, but the remaining four-fifths are furnished with a bushy mass of long hair, each hair being about two inches in length. The color of this graceful appendage is a jet black, which affords a very marked contrast to the light hues with which the body and limbs are tinged, and which gives to the animal a notably handsome aspect. The ears are rather large, and the head tapers rapidly towards the nose.

The general appearance of the Tapoa Tafa is that of a gentle, peaceable little animal, unlikely to do any harm, and well calculated to serve as a domesticated pet.

Never did animal or man hide under a specious mask of innocence a character more at variance with its mendacious exterior.

For the Tapoa Tafa is one of the pests of the colonists, a fierce, bloodthirsty, audacious creature, revelling in the warm flesh of newly-slaughtered prey, and penetrating, in search of food, into the very houses of civilized men. Its small size and sharply-pointed head enable it to insinuate itself through the crevices which are almost necessarily left open in fences and walls, and its insatiate appetite induces it to roam through the store-rooms in search of any animal substances that may have been laid up by the owners. Unless placed under lock and key, behind tightly-closed doors, provisions of various kinds are invaded by the Tapoa Tafa, for its powers of climbing are so great that it can ascend even a perpendicular wall, unless its surface be smooth and hard, so that its sharp curved claws can take no hold.

Fortunately for the farmers, the Tapoa Tafa is not possessed of the chisel-shaped incisor teeth which enable the European rat to gnaw its way through opposing obstacles, so that a wooden door will afford a sufficient barrier against its depredations, providing it be closely fitting, and of solid material. It is said to be very destructive to poultry, and to penetrate by night into the fowl-houses, creeping towards its prey so silently that its presence is not detected, and slaying the inmates as they are slumbering quietly on their perches.

Were its size equal to that of the Tasmanian wolf, the Phascogale would be an effectual bar to civilization in any district which it might frequent. In its wild state its food is of a mixed vegetable and animal nature, and in the stomach of one of these creatures was found a heterogeneous mass of insect remains, mixed with portions of certain fungi.

Not only is the Tapoa Tafa an object of destruction for the repeated acts of depredation which it commits in civilized dwellings, but it has also earned a renowned name among white and black men for the extraordinary energy with which it will defend itself when attacked. Small though it may be, and harmless though it may appear, it deals such fierce and rapid strokes with its sharp claws that it can inflict extraordinarily severe lacerations upon the person of its adversary.

So celebrated is the animal for its powers of resistance, that not even the quick-eyed and agile-limbed native will venture to trust his hand within reach of the claws of an irritated Tapoa Tafa.

Night is the usual time for the Tapoa Tafa to leave its home and prowl about in search of food, but it is often seen by daylight, and appears to be equally vivacious at either time.

It is always a most active animal, and chiefly arboreal in its habits, climbing trees and skipping among their branches with the agility of a squirrel. Its long tail may serve to act as a balance during these excursions, but as it is not in the least prehensile, it cannot afford assistance in the actual labor of passing from one branch to another.

Its home is generally made in the hollow trunks of the eucalypti, and in those dark recesses it produces and nourishes its young. It is very widely distributed over Australasia, being found in equal plenty upon plain or mountain, contrary to the usual habits of Australian animals, which are generally confined within certain local limits, according to the elevation of the ground or the character of the soil.

On account of the large tuft of black hair that decorates the tail, the Tapoa Tafa is in some works mentioned under the title of the "Brush-tailed Phascogale."

THE little animals which are grouped together under the title of POUCHED MICE are tolerably numerous, the genus Antechinus comprising about twelve or thirteen species.

They are spread rather widely over New South Wales and Southern Australia, and as they are prolific creatures, they are among the most common of the Australian quadrupeds. They are all of inconsiderable size, the greater number hardly exceeding the ordinary mouse in dimensions, though one or two species nearly equal a small rat in size.

Arboreal in their habits, they are among the most active of tree-loving quadrupeds, running up and down a perpendicular trunk with perfect ease, and leaping from one branch to another with singular activity of limb and certainty of aim. They can even cling to the under side of a horizontal branch, and are constantly seen running round the branches and peering into any little crevice, precisely after the manner of the ordinary titmice among the birds. They can descend a branch with their heads downward, instead of lowering themselves tail foremost, as is generally the custom among tree-climbing quadrupeds, and traverse the branches with admirable rapidity and liveliness.

The YELLOW-FOOTED POUCHED MOUSE (*Antechinus flavipes*) is a very pretty little creature, its fur being richly tinted with various pleasing hues.

The face, the upper part of the head, and the shoulders are dark gray, diversified with yellow hairs, and the sides of the body are warmed with a wash of bright chestnut. The under parts of the body, the chin, and the throat are uniform white, and the tail is black. There is often a slight tufting of hair on the extremity of the tail.

The total length of the animal is about eight inches, the head and body being rather more than four inches and a half in length, and the tail a little more than three inches.

THE MYRMECOBIUS (*Myrmecobius fasciatus*) is remarkable for several parts of its structure, and more especially so for the extraordinary number of its teeth, and the manner in which they are placed in the jaw. Altogether, there are no less than fifty-two teeth in the jaws of an adult and perfect specimen of the Myrmecobius, outnumbering the teeth of every other animal, with the exception of one or two cetacea and the armadillo. There is no pouch in this animal, but the tender young are defended from danger by the long hairs which clothe the under portions of the body.

It is a beautiful little animal, the fur being of agreeable tints and diversified by several bold stripes across the back. The general color of the fur is a bright fawn on the shoulders, which deepens into blackish-brown from the shoulders to the tail, the fur of the hinder portions being nearly black. Across the back are drawn six or seven white bands, broad on the back and tapering off towards their extremities. The under parts of the body are of a yellowish-white. The tail is thickly covered with long, bushy hair, and has a grizzled aspect, owing to the manner in which the black and white hairs of which it is composed are mingled together. Some hairs are annulated with white, red-rust, and black, so that the tints are rather variable, and never precisely the same in two individuals.

The length of the body is about ten inches, and the tail measures about seven inches, so that the dimensions of the animal are similar to those of the common water vole of Europe.

It is an active animal, and when running, its movements are very similar to those of the common squirrel. When hurried, it proceeds by a series of small jumps, the tail being elevated over its back after the usual custom of squirrels, and at short intervals it pauses, sits upright, and casts an anxious look in all directions before it again takes to flight.

Although not a particularly swift animal, it is not an easy one to capture, as it immediately makes for some place of refuge, under a hollow tree or a cleft in rocky ground, and when it has fairly placed itself beyond the reach of its pursuers, it bids defiance to their efforts to drive it from its haven of safety. Not even smoke—the usual resort of a hunter when his prey has gone to "earth" and refuses to come out again—has the least effect on the Myrmecobius, which is either possessed of sufficient smoke-resisting powers to endure the stifling vapor with impunity, or of sufficient courage to yield its life in the recesses of its haven, rather than deliver itself into the hands of its enemies.

The food of the Myrmecobius is supposed chiefly to consist of ants and similar diet, as it is generally found inhabiting localities where ants most abound. For this kind of food it is well fitted by its long tongue, which is nearly as thick as a common black-lead pencil, and is capable of protrusion to some distance. In confinement, a specimen of the Myrmecobius was accustomed to feed on bran, among other substances. It is known that in the wild state it will eat hay, as well as the "manna" that exudes from the branches of the eucalypti.

It is a very gentle animal in its disposition, as, when captured, it does not bite or scratch, but only vents its displeasure in a series of little grunts when it finds that it cannot escape.

The number of its young varies, but averages from five to eight. The usual habitation of the Myrmecobius is placed in the decayed trunk of a fallen tree, or, in default of such lodging, is made in a hollow in the ground. It is a native of the borders of the Swan River.

There are very few of the marsupiated animals which are more remarkable for their form, their habits, or their character, than the Opossums of America. They are nearly all admirable climbers, and are assisted in their scansorial efforts by their long, prehensile tails, which are covered with scales, through the interstices of which a few short black hairs protrude. The hinder feet are also well adapted for climbing, as the thumb is opposable to the other toes, so that the animal is able to grasp the branch of a tree with considerable force, and to suspend its whole body, together with the additional weight of its prey or its young.

OPOSSUM.—*Didelphys virginiana.*

The Virginian, or Common Opossum, is, as its name implies, a native of Virginia, as well as of many other portions of the United States of America. In size it equals a tolerably large cat, being rather more than three feet in total length, the head and body measuring twenty-two inches and the tail fifteen. The color of this animal is a grayish-white, slightly tinged with yellow, and diversified by occasional long hairs that are white towards their base, but of a brownish hue towards their points. These brown-tipped hairs are extremely prevalent upon the limbs, which are almost wholly of the brown hue, which also surrounds the eye to some extent. The under fur is comparatively soft and woolly, but the general character of the fur is harsh and coarse. The scaly portion of the tail is white.

It is a voracious and destructive animal, prowling about during the hours of darkness, and prying into every nook and corner in hope of finding something that may satisfy the cravings of imperious hunger. Young birds, eggs, the smaller quadrupeds, such as young rabbits, which it eats by the brood at a time, cotton rats, and mice, reptiles of various kinds, and insects, fall victims to the appetite of the Virginian Opossum, which is often not content with the food it finds in the open forests, but must needs insinuate itself into the poultry-yard, and make a meal on the fowls and their eggs. When it has once determined on making such a raid, it can hardly be baffled in its endeavors by any defences except those which consist of stout walls and closely-fitting doors; for it can climb over any ordinary wall, or thrust itself through any fence, so that there is but little chance of preventing it from making good its entrance into the precincts of the farm-yard.

Its proceedings are so admirably related by Audubon, that I can do no better than present the account in his own words, the words of one who has frequently been an eye-witness of the scene which he so graphically depicts:

"Methinks I see one at this moment slowly and cautiously trudging over the melting snows by the side of an unfrequented pond, nosing as it goes for the fare its ravenous appetite prefers. Now it has come upon the fresh track of a grouse or hare, and it raises its snout and sniffs the pure air. At length it has decided on its course, and it speeds onwards at the rate of a man's ordinary walk. It stops and seems at a loss in what direction to go, for the object of its pursuit has either taken a considerable leap, or has cut backwards before the Opossum entered its track. It raises itself up, stands for a while on its hind-feet, looks around, snuffs the air again, and then proceeds; but now, at the foot of a noble tree, it comes to a full stand. It walks round the base of the large trunk, over the snow-covered roots, and among them finds an aperture, which it at once enters.

"Several minutes elapse, when it reappears, dragging along a squirrel already deprived of life, with which in its mouth it begins to ascend the tree. Slowly it climbs. The first fork does not seem to suit it, for perhaps it thinks it might there be too openly exposed to the view of some wily foe, and so it proceeds, until it gains a cluster of branches, intertwined with grape-vines, and there composing itself, it twists its tail round one of the twigs, and with its sharp teeth demolishes the unlucky squirrel, which it holds all the while with its fore-paws.

"The pleasant days of spring have arrived, and the trees vigorously shoot forth their leaves; but the Opossum is almost bare, and seems nearly exhausted by hunger. It visits the margin of creeks, and is pleased to see the young frogs, which afford it a tolerable repast. Gradually the poke-berry and the nettle shoot up, and on their tender and juicy stems it gladly feeds. The matin-calls of the wild turkey-cock delight the ear of the cunning creature, for it well knows that it will soon hear the female, and trace her to her nest, when it will suck the eggs with delight.

"Travelling through the woods, perhaps on the ground, perhaps aloft, from tree to tree, it hears a cock crow, and its heart swells as it remembers the savory food on which it regaled itself last summer in the neighboring farm-yard. With great care, however, it advances, and at last conceals itself in the very hen-house.

"Honest farmer! why did you kill so many crows last winter? aye, and ravens too? Well, you have had your own way of it; but now, hie to the village and procure a store of ammunition, clean your rusty gun, set your traps, and teach your lazy curs to watch the Opossum. There it comes! The sun is scarcely down, but the appetite of the prowler is here; hear the screams of one of your best chickens that has been seized by him! The cunning beast is off with it, and nothing now can be done, unless you stand there to watch the fox or the owl, now exulting in the thought that you have killed their enemy and your own friend, the poor crow. That precious hen under which you last week placed a dozen eggs or so, is now deprived of them. The Opossum, notwithstanding her angry outcries and ruffled feathers, has consumed them one by one; and now, look at the poor bird as she moves across your yard; if not mad, she is at least stupid, for she scratches here and there, calling to her chickens all the while.

"All this comes from your shooting crows. Had you been more merciful or more prudent, the Opossum might have been kept within the woods, where it would have been satisfied with a squirrel, a young hare, the eggs of a turkey, or the grapes that so profusely adorn the boughs of our forest-trees. But I talk to you in vain.

"But suppose the farmer has surprised an Opossum in the act of killing one of his best fowls. His angry feelings urge him to kick the poor beast, which, conscious of its inability to resist, rolls off like a ball. The more the farmer rages, the more reluctant is the animal to manifest resentment; at last there it lies, not dead but exhausted, its jaws open, its tongue extended, its eyes dimmed; and there it would lie until the bottle-fly should come to deposit its eggs, did not its tormentor walk off. 'Surely,' says he to himself, 'the beast must be dead.'

But no, reader, it is only "'possuming,' and no sooner has his enemy withdrawn than it gradually gets on its legs, and once more makes for the woods."

Besides the varied animal diet in which the Opossum indulges, it also eats vegetable substances, committing as much havoc among plantations and fruit-trees as among rabbits and poultry. It is very fond of maize, procuring the coveted food by climbing the tall stems, or by biting them across and breaking them down. It also eats acorns, beech-nuts, chestnuts, and wild berries, while its fondness for the fruit of the "persimmon" tree is almost proverbial. While feeding on these fruits it has been seen hanging by its tail, or its hinder paws, gathering the "persimmons" with its fore-paws, and eating them while thus suspended. It also feeds on various roots, which it digs out of the ground with ease.

Its gait is usually slow and awkward, but when pursued it runs with considerable speed, though in a sufficiently clumsy fashion, caused by its habit of using the limbs of the right and left side simultaneously in a kind of amble. As, moreover, the creature is plantigrade in its walk, it may be imagined to be anything but elegant in its mode of progress upon the ground. Although it is such an adept at "'possuming," or feigning death, it does not put this ruse in practice until it has used every endeavor to elude its pursuers, and finds that it has no possibility of escape. It runs sulkily and sneakingly forward, looking on every side for some convenient shelter, and seizing the first opportunity of slipping under cover.

If chased by a dog, it takes at once to a tree, and unless the dog be accompanied by its master, only climbs to a convenient resting-place, above the limit of the dog's leaping powers, and there sits quietly, permitting the dog to bark itself hoarse, without troubling itself any further about so insignificant an enemy. If, however, as is generally the case, the dog be accompanied by human hunters, the unfortunate Opossum has but little chance of safety. For as soon as the creature is "treed," the quick, sharp bark of the dog conveys to its master the welcome tidings, and he immediately runs towards the point from whence proceeds the well-known voice of his dog.

Having reached the position of the enemy, he ascends the tree in chase of the Opossum, which begins to climb towards the highest branches, followed by its pursuing foe. At last it gains the very extremity of some branch, and holds on with tail and claws, while the man endeavors to dislodge it by shaking violently the bough to which it clings. For a time it retains its hold, but is soon wearied by the constant exertion, and falls heavily to the ground, where it is seized and despatched by the expectant dogs.

The negroes are especially fond of this sport, and look eagerly forward to the close of the day when they have been promised a "'possum-hunt," as a reward for good conduct. Not only do they very thoroughly enjoy the moonlight sport, with its exciting concomitants, but promise themselves a further gratification, after their return home, in eating the Opossums which have fallen victims to their skill. The flesh of the Opossum is white when cooked, and is considered to be remarkably good, especially when the animal is killed in autumn, for at that time of the year it is extremely fat.

Although, from the great accession of fat in the autumn months, it might be thought a hybernating animal, it is found roaming the woods in search of food even in the coldest night of winter. Still, the large amount of fat with which the body is loaded is calculated to give the animal greater powers of resisting hunger and the severity of the weather than would otherwise have been the case, and enables it to thrive upon the comparatively small amount of food which it can obtain during the season of intense cold.

It is not a gregarious animal, and even the members of the same family spread themselves widely apart when they are in the open air.

The Opossum, although so cunning in many respects, is singularly simple in others. There is hardly any animal which is so easily captured, for it will walk into the rudest of traps, and permit itself to be ensnared by a device at which a rat would look with contempt. Strange mixture of craft and dullness; and yet one which is commonly found in all creatures, whether men or animals, that only possess cunning and no observance at all. For there are none so prone to entangle themselves in difficulties as the over-artful. They must needs travel through crooked bye-ways, instead of following the open road, and so blunder themselves stupidly and sinuously into needless peril, from which their craftiness sometimes extricates them, it is true, but not without much anxiety and apprehension.

When captured it is easily tamed, and falls into the habit of domestication with great ease. It is, however, not very agreeable as a domestic companion, as it is gifted with a powerful and very unpleasant odor, which emanates from its person with great force, whenever the animal is irritated or excited.

The nest of the Opossum is always made in some protected situation, such as the hollow of a fallen or a standing tree, or under the shelter of some old projecting roots. In forming an appropriate receptacle for her young, the Opossum is assisted by her fore-feet, which are well adapted for digging. The nest itself is composed of long moss and various dried leaves. Sometimes the creature has been known to usurp the domicile of some other animal, not without suspicion of having previously devoured the rightful owner. On one occasion a hunter sent a rifle-ball through a squirrel's nest, which was placed at some forty feet from the ground, and was surprised to see an Opossum fall dead on the ground. This creature has also been known to possess itself of the warm nest of the Florida rat.

When the young of the Opossum are born, they are transferred by the mother to her cradle-pouch, where they remain for some weeks. From repeated experiments that have been made on this animal, it is found that the transfer is made on the fifteenth day after the young have been called into existence, and that at that period they only weigh four grains, their total length being under an inch, the tail included. Their number is from thirteen to fifteen. After they are placed in the pouch their growth is wonderfully rapid, for in seven days they have gained so much substance as to weigh thirty grains; and even at this early period of their existence their tails exhibit the prehensile capacity, and are often found coiled round each other's bodies. In four weeks the little Opossums have gained sufficient strength to put their heads out of the pouch, and at the end of the fifth week they are able to leave it entirely for a short time.

Very great trouble was required in order to ascertain these particulars, as it was found that the Opossum was in the habit of hiding herself in her den until she had placed her young in the pouch, so that it was needful to search the cavity for these concealed females, and to watch their proceedings by night and day, without intermission.

There are one or two circumstances in connection with this subject that are well worthy of attention.

The young Opossums are not, as has been often asserted, mere helpless lumps of animated substances, without sense or power of determinate action, but are wonderfully active in proportion to their minute size and their undeveloped state. If placed upon a table, they can crawl about its surface, and are sufficiently hardy to retain life for several hours after their removal from the warm cradle in which their tender bodies were shielded from harm, and the maternal fount which poured a constant stream of nourishment into their tiny systems.

Another singular circumstance is, that when they are first placed in the pouch, they are blind and deaf, the eyes and ears being closed, and not opened until many days have elapsed. With partial blindness at the time of birth we are all familiar in the persons of kittens, puppies, and other little animals, but that the tender young of the Opossum should be deaf as well as blind, is truly singular. It appears that in the case of the kitten or puppy, the presence of light and the action of the atmosphere are needed in order to withdraw the obstacles that obstruct the sense of vision. In the young Opossum, however, it seems that the action of the atmosphere is needed in order to render the ears sensitive to the sounds that are transmitted through its mediumship, but that in most cases the little creature requires the absence of light until the time comes for it to open its eyes as well as its ears.

What length of time elapses between the period of transmission into the pouch and the several opening of eyes and ears is not, I believe, as yet clearly ascertained, and would furnish an interesting subject for investigation. I would also suggest that the blood of the young animal be carefully examined in three of its stages, viz., just before it is born, immediately after being placed in the pouch, and after the period when the eyes and ears are opened, in order to ascertain whether any important change, chemical or otherwise, has been made in that liquid by the double action of air and light.

The order which embraces the pouched animals, called in systematic language Marsupials, from the Latin, *marsupium*, a pouch, is well nigh peculiar to that far-away and almost wholly strange country, Australasia. With the notable exception of our Virginia Opossum and a few species of the same genus in South America, the Marsupials are confined to the latter country. Wallace records three genera and twenty-three species of the family *Didelphyidæ*.

The species are most numerous in Brazil. The North American Opossum ranges from the Hudson River to Florida.

The skins of the Opossum are now of considerable commercial value.

The prehensile tail of this animal is well illustrated in the two engravings.

The Crab-eating Opossum is not so large an animal as the Virginian Opossum, being only thirty or thirty-one inches in total length, the head and body measuring sixteen inches, and the tail fifteen. It can also be distinguished from the preceding animal by the darker hue of its fur, the attenuated head, and the uniformly colored ears, which are generally black, but are sometimes of a yellowish tint.

CRAB-EATING OPOSSUM.—*Philander cancrivorus*.

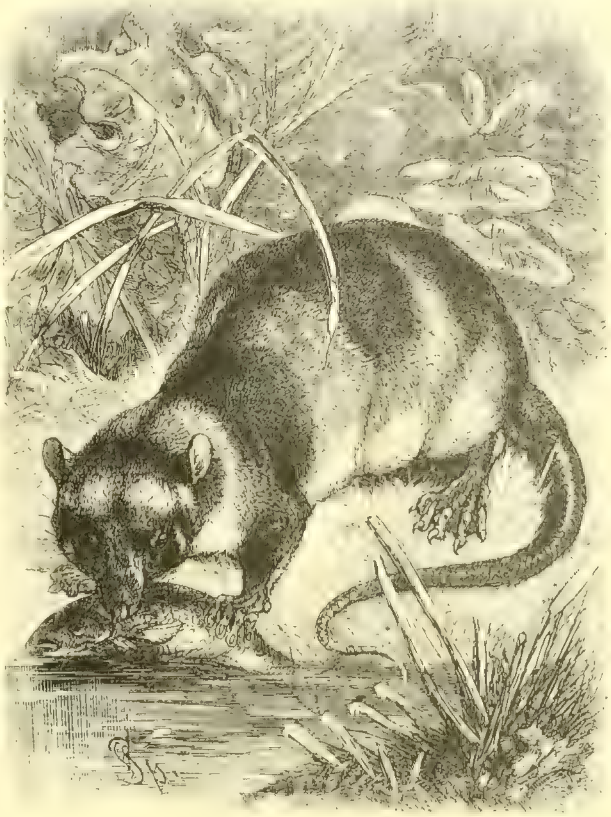
The fur of the Crab-eating Opossum is long, and though rather woolly in texture, is harsh to the touch. From the peculiar coloring of the long hairs that protrude through the thick, close, woolly fur that lies next to the skin, the general tinting of its coat appears rather uncertain, and varies according to the portion which happens to be exposed to view at the time. These hairs are nearly white towards their base, but darken into sooty-black towards their extremities. The limbs and feet are black, and the head is a brownish-white. There is generally an indistinct dark line drawn over the forehead. The tail is covered with scales, interspersed with short hairs, and its basal half is black, the remainder being of a grayish-white. For the first three inches of its length it is densely clothed with sooty-black fur of the same tint as that upon the back, and the remainder of its length is covered with scales and short hair.

The Crab-eating Opossum is peculiarly fitted for a residence on trees, and is never seen to proper advantage except when traversing the boughs, or swinging among the branches by means of its peculiarly prehensile tail. While it is engaged in its arboreal wanderings, it always takes care to twine its tail firmly round the nearest object that is capable of affording a firm hold, and thus secures itself against any unfortunate slip of its paws.

On the level ground its pace is slow, and its gait awkward. It is, however, seldom seen upon the ground, as it is unwilling to forego the advantages of its arboreal residence, except for the purpose of obtaining food. Like the Virginian Opossum, it feeds chiefly on animal food, such as the smaller mammalia, birds, reptiles, and insects, and is so fond of crustacea, that it has been called the Crab-eater from that predilection. As the crabs and other crustaceans on which it feeds are usually found upon low and marshy soils, the Crab-eating Opossum is in the habit of frequenting such localities, and may generally be found in their neighborhood.

This animal is held in some estimation, as furnishing an agreeable meal to those who care for such diet, and its flesh is said by the initiated to resemble that of the hare. The young of the Crab-eating Opossum are, during their days of infancy, colored very differently from the adult animal. When first they are born, they are entirely naked, but when they are large enough to leave the pouch, they are clothed with short silken hairs of a bright chestnut brown, which, after a while, fades into the dark brownish-black of the full-grown animal. In all cases the tinting of the fur is rather variable.

The Crab-eating Opossum is found very numerously in the Brazils, and is spread over the whole of tropical America.


YAPOCK OPOSSUM.—*Cheironectes variegatus.*

Last, and most singular of this group of animals, is the Yapock Opossum, a creature which, abandoning the arboreal life in which its relations so much delight, shifts its residence to the river-banks, and passes an existence almost wholly aquatic.

It is a curious looking animal, and even by the bold markings with which its fur is diversified, is easily distinguishable from any other Opossum. Upon the coat of this animal, the two contrasting hues of gray and sooty-black are so nearly balanced that it is almost impossible to choose either of them as the ground tint and the other as the accessory.

PHOCIDÆ;

COMMON SEALS.

WE now arrive at a very wonderful series of animals, which, although they breathe atmospheric air like other mammalia, are yet almost entirely aquatic in their habits, and are never seen except in the water or its immediate vicinity. The first family of these aquatic mammalia is that which is formed of the animals which are popularly known by the name of Seals.

The structure of their bodies shows that the Seals are intended to pass the greater portion of their existence in the water, for the body is elongated, and formed very much like that of a fish, while the limbs and feet are so modified that they greatly resemble fins, and are put to the same use.

In order to protect their bodies from the debilitating action of the element in which they live, they are thickly covered with a double fur, which, when immersed in water, is pressed tightly to the skin, and effectually throws off the moisture. In some Seals this fur is extremely valuable, and is largely employed as an article of commerce. The fur itself is kept constantly lubricated with a fatty matter secreted by the skin, and is thus rendered waterproof. The more effectually to defend the animal from the icy cold water in which it is often immersed, and from the ice-fields on which it loves to climb, a thick layer of fat is placed immediately below the skin, and being an excellent non-conductor of heat, serves to retain the internal heat through the severest cold. All the fat of the body seems to be pressed into this service, as there is comparatively little of the internal fat that is usually found plentifully in the mammalia.

Aided by the imperfectly developed limbs, the Seals are able to leave the water and to ascend the shore, where they are capable of proceeding with no small rapidity, though in a sufficiently awkward manner, their gait partaking equally of the character of a shuffle and a crawl. When moving in a direct line, without being hurried, they bend their spine in such a manner as to give them the appearance of huge caterpillars crawling leisurely along the ground; the spine is extremely flexible, so that the animal can urge itself through the water in a manner very similar to that which is employed by the fish.

Their clumsy, scuttling movements when on land form a curious contrast with the easy grace of their progress through the water. When the Seals swim, they drive themselves forward by means of their hinder feet, which are turned inward, and pressed against each other so as to form a powerful leverage against the water, as well as a rudder, by means of which they can direct their progress. They are also assisted in some measure by the fore-limbs, but these latter members are more employed upon land than in water, except perhaps for the purpose of grasping their young. On reference to the skeleton of the Seal, shown on page 369, the peculiar formation of the Seal's limbs will be better understood than by the expenditure of a page of actual description alone.

When they desire to leave the water, they rush violently towards the shore, and by the force of their impulse shoot themselves out of the water, and scramble up the bank as fast as they can. On taking again to the water, they shuffle to the edge of the bank, and tumble themselves into the sea or river in a very unceremonious manner, gliding away as if rejoicing that they were once more in their proper element.

The food of the Seals consists chiefly of fish, but they also feed largely upon various crustacea, and upon mollusks. Their powers of swimming are so great that they are able to urge successful chase of the fish even in their native element, and it has several times happened that captive Seals have been trained to catch fish for the service of their owners.

The "whisker" hairs are extremely thick and long, and in many species are marked with a raised sinuous margin, which gives them the appearance of being covered with knobs. Their basal extremities are connected with a series of large nerves, similar to those of the lion's lip, which has already been figured on page 120, and it is very probable that this structure may aid them in the capture of their finny prey. The sense of smell is largely developed, and the tongue is rough, and slightly cleft at its extremity; the reason for this structure is not known.

The brain of the Seal is very large in proportion to the body, and, as might be expected from this circumstance, the creature is extremely intelligent, and is capable of becoming very docile when placed under the tuition of a careful instructor. The eyes are large, full, and intelligent, and the nostrils are so formed that they can be effectually closed while the creature is submerged beneath the surface of the water, and opened as soon as it rises for the purpose of respiration. At every breath the nostrils open widely, and seem to close again by means of the elasticity of the substance of which they are composed. The ears are also furnished with a peculiar structure for the purpose of resisting the entrance of water.

The true Seals are found only in the sea, and at the mouths of various large rivers, and are wonderfully abundant in the polar regions. None of them are known to inhabit the tropical parts of the earth. Several species occur upon our own shores, more especially on the more northern coasts, and the common Seal, *Phoca vitulina*, is found in great numbers around the northern shores.

The teeth of the Seals are very remarkable, and admirably adapted for seizing and retaining the slippery prey. The canine teeth are long, sharp, and powerful, and the molar teeth are covered with long and sharp points of various sizes, so that when once caught in the gripe of these formidable weapons, there is but scant hope of escape for the fish.

The Seals are not very prolific animals; the number of their young family being seldom more than two, and often restricted to a single offspring. As the young Seals would be unable, during the earlier portion of their existence, to battle with the sea waves, and to cling firmly to their parent while she afforded them their needful nourishment, the mother Seal retires to the shores when she is called upon to take upon herself the pleasing cares of maternity, and cherishes her young for a season on land, before she ventures to commit them to the waves.

Owing to the excessive shyness of disposition which characterize the Seals, and the wary caution with which they retire from the sight of mankind, their domestic habits are very little known. Indeed, were it not that many specimens of the common Seal had been captured and tamed, we should have but little information on the manners or the habits of those curious animals. There are many species of Seals, which have been separated into various genera by different authors upon different grounds. Some, for example, found the generic distinction upon the absence or presence of external ears, others from the incisor teeth, and others from the molars and the general character of the skull.

The ORDER which includes the Seals is named *Pinnipedia*, from the wing-like feet, common to all the species; "Flippers" they are called by the "toilers of the sea."

Though inhabiting the sea, these creatures are air-breathing mammals. A view of the skeletons of a Seal, a whale, and a land quadruped gives one at once the true relationship. It is the exterior that is modified to suit the natural surroundings of the animals. Seals are not numerous as species; not over thirty have been recorded. Two species are found in the West India Islands; the remainder are confined to the colder portion of the globe.

Seals are adapted to a certain extent for locomotion on land. The muscles of the trunk are enormously developed, to aid the weaker anatomy of the extremities. Ample opportunity is offered to witness the progression of these creatures in public collections. They bear confinement much better than most animals, requiring little water; thriving well with the meagre supply afforded them in the tanks of the showmen, and fresh water seems all sufficient.

Their movement on land is laborious, and reminds one of the inch-worm, as it hitches along, placing its fore-feet forward, and then quickly drawing the hinder extremities under its body for another spring.

All forms of pinnipeds are voracious to a great extent, spending a large portion of their time in securing food.

It is a curious circumstance that the Seals, though so intensely solid and heavy, are known to sleep on the surface of the sea. They are singularly tender, and easily deprived of life. A smart blow on the nose completely disables them. The Seal-fishers take advantage of this fact, and are able to secure considerable numbers before the herd can disperse.

The nasal bones of the Seals are quite delicate in structure. The skull is thinner than any of the carnivora, which may account for the peculiar vulnerability at this point. Even the ancients knew of this: a passage in Oppian says: "*Non hami penetrant phocas.*" The voice of a Seal is something like the bleating of a young lamb or kid. There were a dozen or more wild Seals (*Phoca vitulina*) brought to the New York Aquarium in the winter of 1877. The keeper, we noticed, handled them very familiarly, yet while doing so, they snarled, and seized the staff which he held with a good deal of savageness, and kept up a sort of growling, which very closely resembled the voice of a cross dog.

Seals are said to be fond of music, and well authenticated instances are recorded of their showing a manifest liking for it. Sir Walter Scott adds his testimony:

"Rude Heiskar's Seals, through surges dark,
Will long pursue the minstrel's bark."

The breeding of Seals in the Arctic regions is accomplished under the deep snow that covers frozen seas. The adults contrive to keep open a passage through the ice, and around the hole the snow is cleared off, leaving a shelf large enough to hold the litter of young. Here the little creatures remain until they are able to take to the water, when, strange to say, they are taught to swim. It was formerly thought that Seals were so organized they could remain indefinitely under water. It is now thought that the faculty is purely through a physiological adaptation. We see how man can endure the extremes of heat and cold. A case nearer to the point is that of the girl who was employed in the New York Aquarium; she practiced remaining under water until it was possible to do so for the space of three minutes.

The importance of the Seal-fishery is very great to several of the nations.

The term *Phocidæ*, applied to the family, is from *Phoca*, a Sea-calf, a term used by the ancients. It embraces all of the so-called Common Seals. The other family includes a number of forms that have external ears, and are named *Otariidæ*, from that circumstance.

Among other more or less important features that distinguish the Common Seals from the Eared Seals is the arrangement of the hind limbs. In the former the limbs are directed backward, and are useless as members on land. In the latter these limbs are movable in all directions, like those of the land animals, and serve them in locomotion on land; in this function suggesting a higher rank in the scale of life.

The Sea Leopard, or Leopard Seal, is distinguishable from the other Seals by means of its comparatively slender neck, and the wider gape of its mouth, which opens further backward than is generally the case among these animals. The body is rather curiously formed, being slender at the neck and largest towards the middle, from whence it tapers rapidly to the short and inconspicuous tail.

The fore-paws are without any projecting membrane, and are largest at the thumb-joint, diminishing gradually to the last joint. The claws are sharp and curved, and rather deeply grooved; their color is black. The hind-feet are devoid of claws and projecting membrane, and bear some resemblance to the tail-fin of a fish. The color of this Seal is generally a pale gray on the upper portions of the body, relieved with a number of pale grayish-white spots which have earned for the animal the name of Leopard Seal. The external ears are wanting

It may be observed in this place, that the situation of these organs is rather remarkable. The external orifice is not placed exactly over the passage that leads to the internal ear, but is situated below and a little behind the eyes, so that there is a tubular passage below the skin that seems to conduct the waves of sound towards the hidden organs of hearing. Partly on account of this structure, and partly because the Seals pass so much of their time below the surface of the water, it has been supposed that the sense of hearing will be little needed by them, and that it is not at all acute.

Yet, any one who has been accustomed to diving must have discovered that when the body is entirely submerged in the water, the auditory organs are very sensitive to sounds which are conveyed through the water, although not to those which are produced on land and are only transmitted through the upper atmosphere. For example, although when a man is entirely submerged he is unable to hear the loudest shouts that can be raised by persons on shore, his ears are almost painfully sensitive to any sound that is produced in the water and is transmitted through its mediumship. A stone thrown into the water, or a blow struck upon its surface, is heard with perfect distinctness, while the measured stroke of oars and their peculiar grinding roll in the rowlocks become perceptible to his ears long before the sound is audible to those who are on land.

SEA LEOPARD.—*Leptonyx leopardinus.*

We must be extremely cautious in offering any conjectures on the supposed efficiency or dullness of certain organs because we fancy that if we were placed under the same conditions our own organs would serve or fail us. In many cases these conjectural assertions, among which we may reckon many of Buffon's brilliant disquisitions, are found to be in direct contradiction to the real facts, and in all instances it is necessary to be exceedingly cautious lest we should overlook some circumstance which may entirely alter the whole aspect of affairs.

Very little is known of the habits of the Sea Leopard, which are probably much the same as those of the common Seal, as Captain Weddell, who first noticed this species, speaks of it casually as a well-known animal, merely mentioning that his men caught so many Leopard Seals, or that they secured so many Seal skins and so many Leopard Seal skins in the course of their hunt.

It does not appear to be a very large animal, as the average length of the largest specimens is scarcely ten feet. Around the largest part of the body, the circumference measures nearly six feet and a half, round the root of the tail about two feet three inches, and round the neck barely two feet. It was recorded by Captain Weddell to have been seen off the South Orkneys. Some specimens in the British Museum were taken off the eastern coast of Polynesia. As far as is yet known, these animals are only found in the Southern hemisphere.

The Crested Seal is a very curious animal, being chiefly remarkable for the singular structure to which it is indebted for its title.

The head of the Crested Seal is broad, especially across the cranial region, and the muzzle is very short in comparison with that of the preceding animal. The teeth are also rather remarkable. The wonderful protuberance which decorates the head of this species with a projecting crest is confined to the adult males, and even in them is not always conspicuously elevated. It is slightly represented in the figure. In the females and the young of both sexes it is hardly perceptible.

CRESTED SEAL.—*Cystophora cristata.*

From the muzzle arises a cartilaginous crest, which rises abruptly over the head to the height of six or seven inches, and is keel-shaped in the middle. This crest seems to support the hood-like sac or cowl which covers the head, and is nothing but an extraordinary development of the septum of the nose, the true nostril opening at each side of it by oblong fissures. The sac is covered with short brown hair, and as it can be inflated or allowed to collapse at the pleasure of the owner, it presents a very grotesque sight.

The real object of this appendage is not known. Some writers lean to the opinion that it is intended to aid in some manner the sense of smell. This conjecture, however, seems to be worthless, as in that case the females and the young would equally need its assistance with the adult males.

Whatever may be the true purport of this crest, it is frequently of great service to the animal in moments of danger. It is well known that the Seals are peculiarly sensitive about the region of the nostrils, and that a comparatively slight blow upon the nose will suffice to stun a Seal that would be but little affected by the heaviest blows upon any other portion of its body. The Crested Seal, however, finds his air-filled helmet of truly invaluable service to him in deadening the force of any stroke that may be aimed at his nose ; for, as has already

Animate Creation.

We have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the Animal World, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an Illustrated Natural History, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. Holder, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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been mentioned, the nostrils are not placed at the extremity of the muzzle, but upon each side of it, and are consequently protected by the overhanging head.

It has often happened that when the Seal-hunters have been engaged in the pursuit of their prey, they have laid several of these animals to all appearance senseless on the ground, awaiting the stroke of the knife that shall complete the victory. The animals, however, are but slightly stunned, and recovering from their temporary swoon, return to the conflict with such unexpected energy that their assailants are forced to have recourse to summary measures when engaged in the chase of these creatures.

The onset of an enraged Crested Seal is much to be dreaded, for the creature is marvellously fierce when its anger is roused, and its strength is very considerable. The teeth, too, are formidably powerful, and can inflict very dangerous wounds. In fighting, they can use their claws as well as their teeth. The males are always pugnacious animals, and during the season when they choose their mates are in the habit of fighting desperately among each other for the possession of some attractive female, and in these combats inflict severe lacerations. During these conflicts the two combatants express their mutual rage by emitting a torrent of loud, passionate, yelling screams, which are audible at a considerable distance.

It is a polygamous animal, one male ruling over a small herd of wives.

The fur of this animal is of some value, and great numbers of these skins are annually imported into Europe, where they are used for various purposes. To the Greenlander this Seal is of incalculable value, as he makes use of almost every portion of its body as well as of its skin. Of the fur he makes his thick, cold-resisting costume, and with the skin he covers those wonderful little boats in which he braves the fury of the ocean in search of his aquatic quarry. Of the stomach he makes air buoys, which he fastens to his lances, and which indicate the position of any Seal or other animal that he may strike, and also serve to tire the wounded prey, and enable the hunter to repeat his blow. Even the teeth are pressed into his service, and are used as convenient heads for his spears.

In the preparation of the Seal skin for civilized nations it is needful to remove the long coarse hairs, and to leave only the soft woolly fur adherent to the skin. The process is very simple, consisting in heating the skin, and then scraping it while hot with a wooden knife.

The color of this creature's fur is, when adult, a dark blue-black upon the back, fading to a yellowish-white on the under portions of the body. A number of large gray patches are irregularly scattered over the body, and in the centre of each patch there is a dark spot. The head, the tail, and the feet, are black. In the young animal the colors are not of the same cast, being during the first year of a slate-gray upon the back and silvery-white below, darkening in the second year to a brownish-gray along the spine.

It is a moderately large animal, being from ten to twelve feet in length when adult, and stout in proportion.

The Crested Seal is found spread over the coasts of Southern Greenland, and is in the habit of reposing much upon ice islands, caring comparatively little for ordinary land. It also frequents the shores of Northern America. From September to March it is found in Davis's Straits, but leaves that locality for the purpose of producing and rearing its young, and returns again in June, together with its offspring, in a very bare and poor condition. About July it takes another excursion, and employs its time in recovering the health and strength which it had lost during the period of its former absence, so that in September it is very fat, and altogether in excellent condition.

By the native Greenlanders it is termed "Neitsersoak."

The natives of the localities which are inhabited by this animal are in the habit of employing two methods for their capture, the one being only a question of patience between the man and the Seal, and the other a fair measurement of human reason against sealish sagacity; the former generally, but not always, proving the superior. The two modes are as follows:

The Seals are in the habit of making, or preserving in some way, certain round holes in the ice, which communicate with the water, and which serve them as doors through which they can enter or leave the water without being forced to crawl to the edge of the ice-field. It seems wonderful that the animals should be able to crawl up the steep and perpendicular sides of these holes, which are sometimes three or four feet in depth, but they manage to perform this feat with entire ease.

Taking advantage of these Seal-holes, the hunter shapes his course towards them, and according to the locality or the bent of his own genius, has recourse to one or other of the established methods by which Seals are killed. The easiest, but at the same time the tardiest and stupidest plan, is to build a kind of barricade of snow and ice at some distance from the Seal-holes, and to lie there concealed until the animal emerges from the sea, and makes its appearance upon the ice-field. As soon as it has travelled to some little distance from its spot of refuge, the hunter seizes the opportunity to inflict a fatal wound, and then uses his best endeavors to prevent his powerful prey from regaining its familiar element.

Should the Seal ever reach the ice-hole, the entire labor of the day is lost, for the unsuccessful hunter is not only disappointed by the escape of his intended victim, but has also the mortification of seeing every Seal upon the ice-field scouring towards the ice-holes, and disappearing therein, no more to venture upon open ice that day.

The second mode of Seal killing is much more sportsman-like, and needs not the long and wearisome watch behind the ice barrier.

Leaving his sledge and dogs at a distance, but within convenient call, the cautious hunter takes his weapons, and proceeds silently and slowly towards the spot where he sees a Seal reposing itself upon the ice. As soon as he perceives the animal to betray signs of distrust, he drops prostrate upon the ice, and remains motionless until the Seal recovers from its alarm, and again composes itself to rest. From this moment, the man is obliged to cast away all human habits and movements, and while lying prostrate on the ice to imitate the actions of a Seal.

Taking care to remain motionless whenever he sees the Seal looking in his direction, he creeps gradually towards his intended prey, in hopes of getting between the ice-hole and the Seal, in which case the death of the latter is almost inevitable. If, however, the relative position of man, Seal, and ice-hole be such that this manœuvre becomes impossible, the hunter contrives to crawl up to the sleeping Seal, and with a single blow lays it lifeless upon the ice.

The Crested Seal, or Hooded Seal, has been until quite lately misrepresented with respect to its peculiar nasal development. The latter is known to be a prolongation of the snout, much as in the Elephant Seal. Therefore, the figures given should not have the enlargement on the head, but it should be represented as protruding from the end of the nose. The adult males only have it.

A fine example is in the American Museum of Natural History, in Central Park, measuring about twelve feet in length. The female is also there.

The Common Seal is spread very widely over many portions of the globe, and is of very frequent occurrence upon our own coasts, where it is found in considerable numbers, much to the annoyance of the fishermen, who look upon it with intense hatred, on account of the havoc which it makes among the fish.

It is rather a handsome animal, with its beautifully mottled skin and large intelligent eyes, and although not so large as other species which are also found upon our coasts, yields to none of them in point of beauty. The color of its fur is generally of a grayish-yellow, sprinkled with spots of brown, or brownish-black, which are larger and more conspicuous along the back than upon the sides. The under portions of the body are of a much lighter hue. The feet are short, and the claws of the hinder feet are larger than those of the anterior limbs. The total length of the adult Seal is seldom more than five feet, the head being about eight or nine inches long.

This creature is wonderfully active both in water and on land, although its bodily powers are but awkwardly manifested when it is removed from the watery element in which it loves to roam. It is a persevering hunter of fish, chasing and securing them in a manner that greatly excites the wrath of the fishermen, who see their best captives taken away from them without the possibility of resistance. So cunning as well as active is the Common Seal, that one of these animals will coolly hang about the fishing grounds throughout the season, make itself familiar with all the turns and angles of the nets, and avail itself of their help in capturing the fish on which it is desirous to make a meal.

A crafty old Seal will sometimes continue this predatory mode of existence for a series of years, until his person becomes familiar to the fishermen, and will carry out his depredations with such consummate skill that the fishermen can find no opportunity for stopping his career with a rifle-bullet or a fish-spear. Seals have been known in this manner to haunt the salmon fisheries as long as the nets were down, and when the fishing season was over, and the nets had been removed, have been seen to ascend the rivers for some miles, in order to devour the spawning fish.

There is a curious tradition among the inhabitants of the Irish coast respecting the Seal, which constantly haunts the same spot through a series of many years.

They think that the animal is supernaturally protected from harm of any kind;—that bullets will not strike him, however well the gun be aimed; that steel will not enter his body, however keen the blade, or however strong the arm that urges it; and that the long array of nets are powerless to retain so puissant a being in their manifold meshes. So after a while a Seal, if he be only bold and wary, may lead a luxurious life at the fishermen's cost, for no one will venture to attack an animal that bears a charmed life.

Fortunately for the Seals in general, they are not often visited by the wrath of those whom they rob, for there is a feeling prevalent among many fishermen that to kill a Seal is unlucky, and that such a deed would prevent the murderer from obtaining any more success at sea. This humane idea seems, however, to extend no further than the regular fishing grounds, for the chase of the Seal has long taken its place among the most valuable of commercial speculations, and is of extreme importance.

The general mode of securing these creatures is to land quietly, and to cut off the return of the terrified animals, which are quickly despatched by smart blows from a bludgeon across their nose. When driven to desperation, they fight savagely, and a single Seal is no mean antagonist for a man, provided that he is not a practical Seal-hunter. The creature has an awkward way of lying on its side, shuffling rapidly along, and scratching furiously with its fore-paws. And if its antagonist should endeavor to cut off its retreat, it will boldly fling itself upon him, and endeavor by the violence of its onset to bear him to the ground.

Should the beach be composed of pebbles or shingles, it is the hunter's best policy to face the animal, and trust to his cudgel for stunning the Seal as it comes along. For when the Seal is galloping along the beach after its own rapid but awkward fashion, it flings the stones behind it with such violence that the pursuer can hardly escape from receiving severe blows from these strangely-launched missiles. Some writers suppose that the Seal uses this mode of defence wittingly, but the general opinion on the subject is, that the peculiar gait of the animal is the cause of this Parthian assault, without any voluntary intention on the part of the Seal itself.

On our coasts the chase of the Seal is but of local importance, but on the shore of Newfoundland it assumes a different aspect, and becomes an important branch of commercial enterprise, employing many vessels annually. In a successful season the number of Seals which are taken amount to many hundred thousand. A large quantity of oil is obtained from the bodies of the Seals, and is used for various purposes, while their skins are of considerable value either when tanned into leather or when prepared with the fur, and used for making various articles of dress and luxury.

On the British coasts Seal-shooting is much followed, and is thought to be a very exciting pursuit, requiring much steadiness of nerve as well as strength of body and quickness of eye.

So quick is the animal in its movements, that with the old flint-lock guns the sportsman could seldom succeed in killing a Seal; for at the flash of the powder in the pan the Seal would instantly dive below the surface, leaving the bullet to speed harmlessly over its head. With the present weapons the Seal may be readily killed, provided that the hunter be able to take a rapid and certain aim in spite of the rocking of his boat or the movements of the Seal.

It is no easy matter to hit a Seal, even at the short range of a hundred yards, for the creature exposes but little of its person above the surface of the water, and if alarmed, does not remain exposed for more than a few seconds.

It is very tenacious of life, and requires a heavy missile to kill it upon the spot, the ordinary "pea rifles" being of little use for such a purpose. Should the Seal not be killed immediately, the sportsman will never obtain possession of his prey, and even when a well directed shot has instantaneously deprived the animal of life, it will often sink out of reach unless struck by a barbed fish-spear, which should always be kept in readiness for that purpose.

Much sea-craft is required for the chase of the Seal, as well as considerable knowledge of the animal and its habits. It is a remarkable fact that if the Seal be disturbed while the tide is ebbing, it will always make its way seawards; but that if it be alarmed while the tide is flowing, it will direct its course towards the land.

The Seal is also a good natural barometer, and by its movements indicates to a practised eye the forthcoming changes in the weather. Whenever an old Seal is seen rolling and tumbling along a bank, a storm of wind and rain is sure to ensue before many hours have passed.

This species of Seal, in common with several others, is mightily fond of musical sounds, and has often been known to follow a boat while some one was playing on a musical instrument. Some persons say that the Seal-shooters ought always to be accompanied by a piper in order to induce the Seals to approach, and assert that the animals prefer the sound of the bagpipes to that of any other instrument, an assertion which, if true, only shows that the Seal must be in the very earliest stage of musical feeling.

The Common Seal is very easily tamed, and speedily becomes one of the most docile of animals, attaching itself with strong affection to its human friends, and developing a beautifully gentle and loving nature, hardly to be expected in such an animal. Many of these creatures have been taken when young, and have been strongly domesticated with their captors, considering themselves to belong of right to the household, and taking their share of the fireside with the other members of the family. An interesting account of a tame Seal was lately sent to the *Field* newspaper, and runs as follows:

"If taken young and treated kindly, the Seal will rival the dog in sagacity and affection for its master.

"When a boy, I was presented by some fishermen with one apparently not more than a fortnight old, which in a few weeks became perfectly tame and domesticated, would follow me about, eat from my hand, and showed unmistakable signs of recognition and attachment whenever I approached. It was fond of heat, and would lie for hours at the kitchen fire, raising its head to look at every new-comer, but never attempting to bite, and would nestle close to the dogs, who soon became quite reconciled to their new friend.

"Unfortunately the winter after I obtained it was unusually rough and stormy. Upon the wild coasts boats could seldom put to sea, and the supply of fish became scanty and precarious. We were obliged to substitute milk in its place, of which the Seal consumed large quantities, and as the scarcity of other food still continued, it was determined, in a family council, that it should be consigned to its own element, to shift for itself.

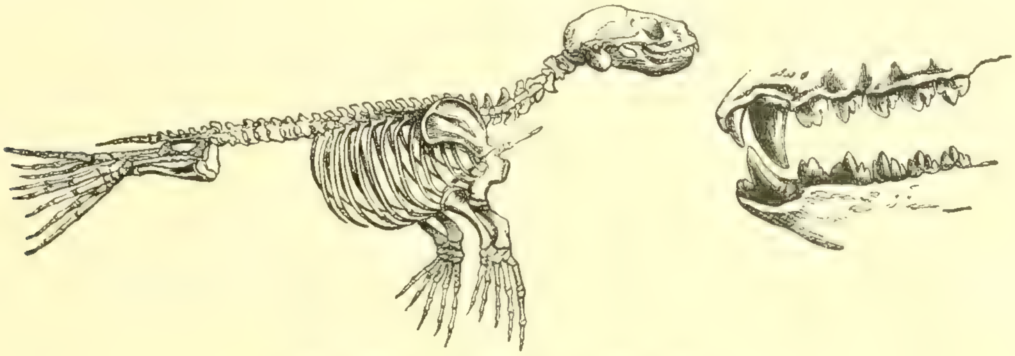
"Accompanied by a clergyman who took a great interest in my pet, I rowed out for a couple of miles to sea, and dropped it quietly overboard. Very much to our astonishment, however, we found that it was not so easy to shake it off. Fast as we pulled away it swam still faster after the boat, crying all the time so loudly that it might easily have been heard a mile away, and so pitifully that we were obliged to take it in again and bring it home, where, after this new proof of attachment, it lived in clover for several months, and I believe might still be in existence but for the untimely fate which most pets are doomed sooner or later to experience, and to which this one was no exception."

A somewhat similar story is told in Maxwell's "Wild Sports of the West," where may be found a very interesting and touching narrative of a tamed Seal, which lived for several years with a family, and which, although it was repeatedly taken out to sea in a boat and thrown overboard, always found its way back again to the house which it loved, even contriving to creep through an open window, and to gain access to the warm fireside. The end of this poor creature was a sadly tragic one, and need not be narrated here.

In the same work is a very spirited account of another Seal adventure, in which the ludicrous element prevails, although it might have furnished material for tragedy.

A number of men had gone in a boat to the Sound of Achil, and having seen a Seal and her young one reposing on the sand, had borrowed an old musket, and set off to attack them. They succeeded in securing the cub before it could reach the sea, and tossed it into their boat. The mother Seal, however, inspired by maternal love, swam after the boat which contained her offspring, and could not be deterred from following the captors in the hope of rescuing her child. The men attempted several times to shoot the poor creature, but their rickety weapon would not explode until it had been several times futilely snapped. At last, however, it performed its duty, and lodged the ball in the Seal's head.

The body was immediately lifted into the boat, when, to the horror of the captors, the animal, which was only stunned, recovered its senses, and began a most furious attack upon its enemies, floundering about the boat with such energy that she nearly overset it, and snapping fiercely at the legs of her antagonists. The contest soon assumed a serious aspect, for the teeth of the angry animal were urged with such fury that they cut deeply into the oars with which her attacks were warded off, and if assistance had not speedily arrived, the result might have been of a very tragic nature. A gentleman, however, that happened to be sailing near the scene of combat, was attracted by the curious spectacle of a boat's crew engaged in such strange evolutions, and directing his course towards them, ended the combat by a rifle bullet.



SKELETON AND TEETH OF COMMON SEAL.

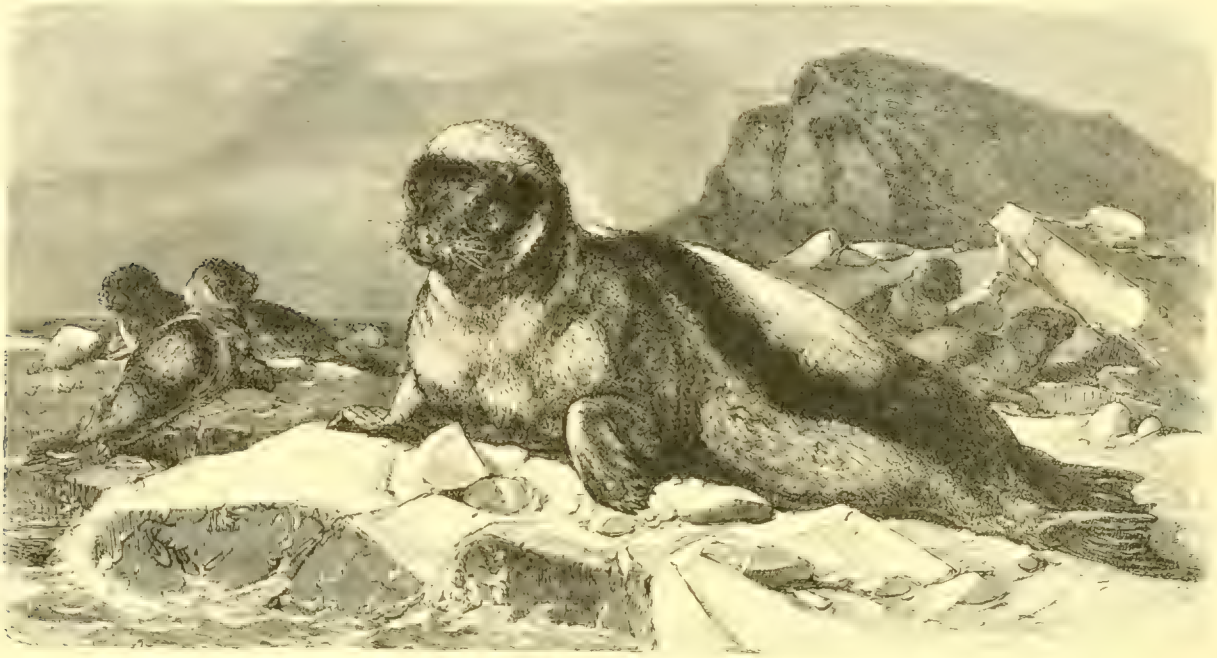
Of late days, performing Seals have come into vogue under various titles, among which the "Talking Fish" is well known. These clever animals have been taught to perform sundry ingenious feats, requiring not only an intelligent mind to comprehend, but an activity of body to execute, apparently incompatible with the conformation of the animal.

They will bark at the word of command, their phocine tongue being very freely translated into the language of any country in which they may happen to be; they will rotate in their water tub with singular velocity; they will offer to kiss any one who is not afraid of their large wet hairy mouth, and in fine will go through many similar performances with great skill and seeming enjoyment of the attention paid to them by their visitors. For they are wonderfully fond of admiration, these Seals, and although very shy to those with whom they are unacquainted, and before they have become accustomed to the sight of strangers, are highly appreciative of the kind words and caresses which fall to their lot while they are going through their tricks.

Even the Seals at the Zoological Gardens, who are not put through any particular training, are not without their little coquetries with regard to the ever-changing circle of visitors who stand around the railings which inclose their habitations, while their demonstrations of affection towards the keeper who attends to their wants are quite lively. They recognize him at a considerable distance, and shooting rapidly through the water, fling themselves upon the bank, scuttle to the iron fence and rear themselves against the rails in impatient greetings, long before he reaches the limits of their home. Perhaps these ebullitions of regard are not totally personal to the keeper, but are partly caused by certain pieces of fish which he carries with him. As soon as they receive the expected gift, they seize it between their teeth, and unless they happen to be hungry, become very playful, and execute all manner of aquatic gambols before they eat it, much after the manner of a cat with a mouse.

The specific name of *vitulina*, or calf-like, has been given to the Common Seal, not because it presents a calf-like aspect, but because its voice is thought to bear some resemblance to the plaintive cry of a calf when separated from its mother.

The Common Seal, known in all the northern regions of both continents, was formerly quite abundant along the Atlantic shores as far south as Long Island and the Chesapeake Bay. The rocks in New York Harbor called Robbins' Reef, were so named by the early Dutch settlers, because they were the resort of numerous Seals, the term robbin being derived from the Dutch, meaning Seal.



HARP SEAL, OR ATAK.—*Phoca grœnlandica.*

Seals have been kept in the New York Aquarium, and have been taught to perform many feats of intelligence. Their large round heads and beautiful eyes are charming features.

This Seal is seldom seen now south of Cape Cod. In Lynn Harbor, Mass., a few yet live on the "Lobster Rocks."

The Harp Seal derives its name from the very conspicuous manner in which its fur is colored.

The general hue of the Harp Seal's coat is a whitish-gray, and upon that delicate tint are drawn two broad, semicircular bands of a deep black, their points nearly touching each other, and extending from the shoulders nearly to the root of the tail. These dark markings are thought to bear some resemblance to an ancient harp, and have given rise to the popular name by which this species is designated. The muzzle and fore part of the head is also black. This peculiar coloring, which seems to distinguish this animal from any other species of Seal, is, however, never seen except in the adult animal, and is not considered to be perfect until the creature has attained its fifth year. Very many animals are variously marked according to their ages, sex, and time of year, but there are few which undergo more decided changes than the Harp Seal; changes so unexpected that they have caused the animal to be described under several different titles according to the particular coat which it happened at that time to wear.

In the first few months of its existence, the fur of the Harp Seal is white in color and woolly in texture. At the expiration of a year the white changes to a grayish-cream. In the second year, the fur is entirely gray. In the third year, the gray is diversified with stripes of darker hues, and varying in number, dimensions, and position. The fourth year changes the stripes into spots, and in the fifth year, the semi-lunar black stripes make their appearance.

The Greenlanders designate the Harp Seal by different titles according to its years; giving it the name of Atak, or Attarak, in its first year, Atteisiak in the second, Agletok in the third, Milektok in the fourth, and Attarsoak in the fifth.

The Harp Seal is found in great numbers upon the coasts of Greenland, Iceland, and other localities, and is rather peculiar in its mode of life. It does not much affect the shore after the fashion of many Seals, but prefers to take up its residence upon floating ice-islands, disregarding even the more solid fields of ice that are so much frequented by other animals belonging to the same family. It is found in considerable numbers, congregating together in herds under the leadership of a single chief, and constantly subject to his authority.

There is always a sentinel planted by every herd, whose duty lies in looking out for danger, and giving timely warning to the remainder of the herd. The Harp Seal seems withal to be rather a reckless being, in spite of this precaution, for it is easily approached by a cautious hunter, and can be destroyed with little difficulty. Sometimes it prefers to takes its repose without trusting itself upon ice or land, and sleeps while floating on the surface of the sea. In this situation its slumbers are so profound that it has often been surprised and slain before it has awoke from its treacherous somnolence. The Harp Seal is moderate in size, being generally about seven or eight feet in length and proportionably stout. Some very large specimens, however, are said to reach the length of nine feet.

It is an extremely valuable animal both to Europe in general, and to the uncivilized inhabitants of Greenland. In this country we value the Harp Seal principally on account of the excellent oil which it furnishes, and which is allowed to be of a purer and better character than that which is obtained from other oil-producing animals. The creature is remarkably well furnished with the fatty substance from which the oil is obtained, and is therefore eagerly pursued, irrespective of the value which is set upon the fur.

The food of this animal is almost wholly of an animal nature, and consists chiefly of salmon and other fish, together with various mollusks and crustaceans. It, however, stands in great dread of other species of Seal, such as the Sea Lion and Sea Bear, and according to many accounts holds the spermaceti whale in awe, being chased by that formidable creature into the shallow waters of the shore. Twice in the year the Harp Seal indulges in a migration similar to that which has already been described when treating of the Sea Leopard. The young of this species are sometimes two in number, although the maternal Seal is often forced to content herself with a single child.

Like the Common Seal, the Atak is possessed of much intelligence, and is very capable of domestication.

Two of these animals which were placed in the zoological collection at the Jardin des Plantes, were at their first arrival extremely shy, and would avoid the person of a man with every mark of terror. Yet in a very short time they became quite tame, and would voluntarily seek the caresses of those who had behaved kindly towards them. They also struck up a great friendship with two little dogs, and would permit their little playfellows to take all kinds of liberties with them, permitting the dogs to sit on their backs and bark, and not even resenting an occasional bite. They would even permit the dogs to take their food from their mouths, but if their relation attempted to act in like manner, a sharp combat immediately took place, the weaker being forced ultimately to succumb to superior might.

In cold-weather, dogs and Seals were accustomed to huddle closely together for the sake of warmth, and when the dogs made their way out of the entrance, the Seals did their best to follow their little playfellows, caring nothing for the rough ground over which they were forced to pass.

The Harp Seal is an abundant species in Greenland, and forms one of the great necessities of the Esquimaux—all parts of its body being utilized in the domestic requirements of that race. Numerous popular names are attached to the Common Seal, as, Sea-dog, Sea-calf, Sea-cat; Scotch fishermen call it Telkie, and Tang-fish. In West Scotland it is Rawn. The Germans term it Sea-hound. The Esquimaux call it Tupelo. The Harp Seal is called Saddle-back by English sailors, and White-coats and Bed-lampiers by the Newfoundland sealers. The Greenlanders name it Atak.

Stragglers find their way into the temperate climate, and this species is now recognized as belonging to the fauna of the northern portions of both continents.

A full-grown Harp Seal weighs two hundred and thirty pounds; the skin and blubber weighing one hundred pounds.

The Banded Seal is a very rare form. It is found among the Aleutian Islands, near the coast of Alaska, bordering on the Behring's Sea. Until lately no specimen of this Seal had been added to the collections in this country. At present two are known: one in the Smithsonian Institution, and the other in the American Museum of Natural History, in Central Park. The black and white markings render it wholly different in color from any other species. The arrangement of the bands is pleasingly regular, distinguishing it from all others. The female has no bands, but is of a dull uniform color.

The Ringed Seal (*Callocephalus hispidus*) is found in the far north. It is sometimes called the Fœtid Seal (*Callocephalus fœtidus*) and Hoe-rat of the English sailors. It secretes a fœtid substance that is excessively disagreeable. Homer refers to this:

> "Web-footed seals forsake the stormy swell,
> And sleep in herds, exhaling nauseous smell."

A species called Richards's Seal (*Halicyon richardi*) inhabits the Columbia River and North Pacific coast.

Peale, of Wilkes's Expedition, discovered a Seal, which inhabits the coast of Oregon and California. Its systematic name is *Phoca pealii.*

The Bearded Seal (*Phoca barbata*), also called Leporine Seal, and Great Seal, is distinguished by having larger moustaches, and by being one of the largest of the order. It is particularly prized by the natives on account of its great size, the skins being useful for making tackle, etc. Its length is about fourteen feet.

The White-Cheeked Seal (*Phoca naurica*) inhabits the North Pacific coasts. It is closely allied to the preceding.

Another group of Seals, having characteristics differing from the preceding, embraces as an American species the Gray Seal (*Halichorus gryphus*). It is the Haaf-fish mentioned by Sir Walter Scott in the "Pirate."

This species is thought to resemble the walrus in some features. The singularly disproportionate size of the brain to its great bulk, is accompanied by a lack of intelligence. It does not, in common with the walrus, exhibit that pleasing, bright, and knowing aspect that is common to all other species. The brain of one eight feet in length did not exceed that of a Common Seal of four feet in length.

AMONG all the strange forms which are found among the members of the phocine family, there is none which presents a more terribly grotesque appearance than that of the WALRUS, MORSE, or SEA HORSE, as this extraordinary animal is indifferently termed.

The most conspicuous part of this animal is the head, with its protuberant muzzle bristling with long, wiry hairs, and the enormous canine teeth that project from the upper jaw. These huge teeth measure, in large specimens, from fourteen inches to two feet in length, the girth at the base being nearly seven inches, and their weight upwards of ten pounds each. In ordinary specimens, however, the length is about one foot. In some examples they approach each other towards their points, and in others they diverge considerably, forming in the opinion of some writers two distinct species. As, however, the relative position of these teeth varies slightly in every specimen that has yet been examined, the structure seems to be of hardly sufficient importance for the establishment of a separate species. The ivory which is

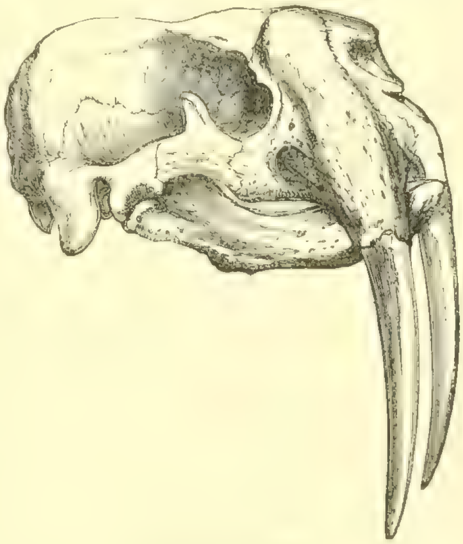
WALRUS.

furnished by these extraordinary weapons is of very fine quality, and commands a high price in the market.

By means of the great development of these teeth, which are necessarily buried deeply in the upper jaw, the muzzle is much enlarged in order to afford room for their sockets, and assumes the remarkable prominence that gives to the animal so ferocious an aspect. As there would be insufficient space for the nostrils if placed in their usual position, they are removed to a much higher locality than that which they occupy in other Seals, and open nearly vertically above the muzzle.

The other teeth of the Walrus are very small in comparison with the two canines of the upper jaw, and in number are exceedingly variable, according to the age of the animal. During the earlier years of its life, it is furnished with six incisors in each jaw, two canines, ten molars in the upper jaw and eight in the lower. But when the animal approaches maturity, the incisors all fall out, and even in a prepared skull, they come away together with the soft substances. The tooth which is sometimes considered to be the first molar of the lower jaw, is in reality the lower canine.

In order to accommodate itself to the position of the huge tusks, the lower jaw narrows rapidly towards its point, so as to pass easily between the canines. The food of the Walrus consists of small Seals, fish, shrimps, and various other animal substances, diversified with such vegetable diet as the sea can afford. It has been suggested that one object of the large tusks may be to drag the algæ from their hold upon the rocks.


SKULL OF WALRUS.

A Walrus is a valuable animal, for even in this country its skin, teeth, and oil are in much request, while among the Esquimaux its body furnishes them with almost every article in common use. Among civilized men, the skin of the Walrus is employed for harness and other similar purposes where a thick and tough hide is required. The tooth furnishes very good ivory, of a beautiful texture, and possessing the advantage of retaining the white hue longer than ivory which is made from the elephant tusk. The oil is delicate, but there is very little to be obtained from each Walrus, the layer of fatty matter being scarcely more than a hand's-breadth in thickness. Among the Esquimaux the Walrus is put to a variety of uses. Fish-hooks are made from its tusks, its intestines are twisted into nets, its oil and flesh are eaten, and its bones and skin are also turned to account by these rude but ingenious workmen.

In former days, the chase of the Walrus was an easy matter, for the powerful brutes seemed to be so satisfied of their strength that they would permit their assailants to approach them closely, and to inflict fatal wounds without any opposition. Now, however, they have learned caution by many a bitter experience, and are extremely wary animals. They are tenacious of life, and dangerous antagonists, for although they seldom, if ever, commence an attack, they are most furious when opposed or wounded, and fight with marvellous energy. In the conflict the enormous tusks prove themselves to be truly formidable weapons, and have been known to pierce through the plankings of a boat. Even the polar bear stands in awe of these weapons, and has often been beaten off by an old Walrus on whom it had hoped to make a meal.

The Walrus is found in vast herds, which frequent the coasts of the arctic and antarctic regions, and which congregate in such numbers that their united roarings have often given timely warning to fog-bewildered sailors, and acquainted them with the near proximity of shore. These herds present a curious sight, as the huge clumsy animals are ever in movement, rolling and tumbling over each other in a strange fashion, and constantly uttering their hoarse bellowings.

As soon as a Walrus gets out of the water, it lies down on the shore, and would not of its own free will stir from the spot on which it had first laid itself to repose. But another Walrus soon emerges from the sea, and as it cannot very well climb over its comrade, begins to butt him until he moves farther on, and makes room for the new-comer. Others land in rapid succession, and the whole strand is soon full of life, for these unreflective creatures never think of taking a short walk inland, so as to secure a quiet berth at ease, but must needs lie down where they land, although they are sure to be disturbed by their comrades as they rise out of the sea. As many as seven thousand have been seen in a single herd, so that to attack one of these assemblies is no slight matter, for as soon as they take alarm, they all come scuttling towards the sea, tumbling over each other in their haste, and presenting a formidable front simply by the weight of their huge bodies.

In order to prevent the whole herd from making a simultaneous charge at their invaders, the hunters endeavor to disperse them by means of dogs trained to the business, and so to secure the animals as they fly affrighted in various directions. One such chase is technically termed a "cut," and if rightly conducted is so successful that at a single "cut" no less than fifteen hundred of these huge Seals have been taken. These chases take place at night.

The movements of the Walrus when on land are of a very clumsy character, as might be supposed from the huge, unwieldy body of the animal, and the evident insufficiency of the limbs to urge the weighty body forward with any speed. When this creature is hurried or alarmed, it contrives to get over the ground at a pace that, although not very rapid, is yet wonderfully so when the size of the animal is taken into account. The movement is a mixture of jerks and leaps, and the Walrus is further aided in its progress by the tusks. Should it be attacked, and its retreat cut off, the Walrus advances fiercely upon its enemy, striking from side to side with its long tusks, and endeavoring to force a passage into the sea. If it should be successful in its attempt, it hurries to the water's edge, lowers its head, and rolls unceremoniously into the sea, where it is in comparative safety.

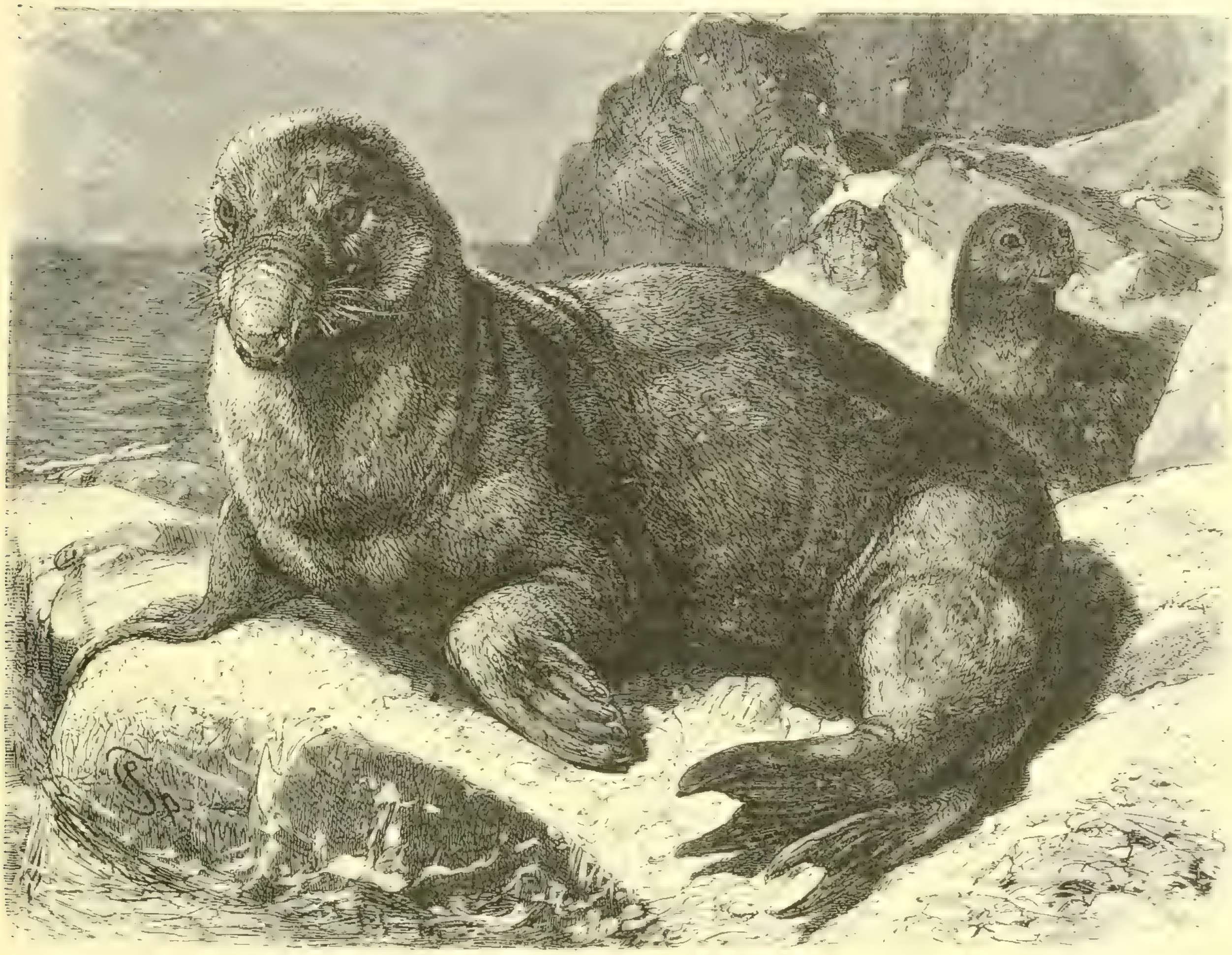
The Walrus is possessed of the same docile and affectionate disposition as the other Seals, and has been more than once effectually tamed. One of these animals which was captured while young, at Nova Zembla, and brought here, was remarkably gentle in its demeanor, and learned many accomplishments from its owner. It had been so well instructed, that if taken in a boat, it would leap overboard at the word of command, chase and catch fish, and return to the boat bearing the fish in its mouth.

The number of young which the Walrus produces at a litter is seldom if ever more than one, and when newly born, the little animal is about the size of a yearling pig. Winter is the usual time of year for the appearance of the young, and the mother always repairs to the shore or to the ice-fields for the purpose of nourishing her family. The maternal Walrus is very attentive to her charge, and while in the water is very solicitous about its welfare, carrying it about under her fore-limbs, and defending it from any danger that may arise, regardless of her own safety in watching over that of her offspring. When a mother Walrus is surprised upon the shore, she places her young one upon her back, and hurries away to the sea, bearing her precious burden.

This animal attains to a very great size, so great, indeed, that its dimensions can hardly be appreciated except by ocular demonstration. A full-grown male Walrus is generally from twelve to fifteen feet in length, while there are many specimens that have been known to attain a still greater size. The skin is black and smooth, and is sparingly covered with brown hairs, which become more numerous on the feet. The eye is very small in proportion to the size of the animal, and after death sinks so completely into its socket that it cannot be seen except by an experienced observer. By pressure upon each side of the orbit, the eye suddenly starts forward, and becomes visible.

The Walrus has once or twice been seen off the British coasts, but is so very rare a visitant that any such occurrences can only be considered as exceptional to the general rule. The term Walrus literally signifies "whale horse," and the specific name, *rosmarus*, is a Latinized form of the Norwegian word Rosmar, or "sea horse." The word Morse is slightly altered from the Russian Morss, or the Lapponic Morsk.

The Walrus is manifestly the most remarkable of all marine animals, in respect to its uncouth bulk. It is a puzzle, seemingly. The reader should look at the enormous specimen of this creature in the Museum at Central Park, to form anything approaching an adequate idea of its proportions. When we observe the immense bulk, almost unprovided with limbs (for the latter are so small they seem out of all proportion to the requirements), the wonder is, how can the creature climb from the water to the ice or cliffs. The stout tusks are very serviceable, doubtless, but they seem to our limited comprehension entirely in the way. It is difficult to see how the creature can feed with those ivory canines directed straight downwards. Nature never fails of its purposes, but there are instances of organization and structure that surprise us and baffle our comprehension.



SEA ELEPHANT.—*Cystophora proboscidea.*

The Walrus is seen in vast herds at times, frequenting both polar seas. Two well-marked species are known, that of the Pacific coast differing in some particulars from that of the Atlantic.

Another powerful and grotesque Seal now engages our attention. This is the Elephant Seal, or Sea Elephant, so called not only on account of the strange prolongation of the nose, which bears some analogy to the proboscis of the elephant, but also on account of its elephantine size. Large specimens of this monstrous Seal measure as much as thirty feet in length, and fifteen or eighteen feet in circumference at the largest part of their bodies.

The color of the Sea Elephant is rather variable, even in individuals of the same sex and age, but is generally as follows. The fur of the male is usually of a bluish-gray, which sometimes deepens into dark brown, while that of the female is darker, and variegated with sundry dapplings of a yellow hue. This animal is an inhabitant of the southern hemisphere, and is spread through a considerable range of country. It is extensively hunted for the sake of its skin and its oil, both of which are of very excellent quality, and, from the enormous size of the animal, can be procured in large quantities. It is not exclusively confined to the sea, but is also fond of haunting fresh-water lakes, or swampy ground.

It is an emigrating animal, moving southwards as the summer comes on, and northwards when the cold weather of the winter months would make its more southern retreats unendurable. Their first emigration is generally made in the middle of June, when the females become mothers, and remain in charge of their nurseries for nearly two months. During this time the males are said to form a *cordon* between their mates and the sea, in order to prevent them from deserting their young charges. At the expiration of this time, the males relax their supervision, and the whole family luxuriates together in the sea, where the mothers soon regain their lost condition. They then seek the shore afresh, and occupy themselves in settling their matrimonial alliances, which are understood on the principle that the strongest shall make his choice among the opposite sex, and that the weakest may take those that are rejected by his conquerors, or none at all, as the case may be.

During the season of courtship the males fight desperately with each other, inflicting fearful wounds with their tusk-like teeth, while the females remain aloof, as quiet spectators of the combat. They are polygamous animals, each male being lord over a considerable number of females, whom he rules with despotic sway. When the victorious combatants have chosen their mates, they are very careful about their safety, and refuse to quit them if they should be in any danger. Knowing this fact, the Seal-hunters always direct their attacks upon the females, being sure to capture the male afterwards. If they were to kill the male at first, his harem would immediately disperse and fly in terror, but as long as he lives, they will continue to crowd round him.

Although these animals are of so great dimensions and bodily strength, and are furnished with a very formidable set of teeth, they are not nearly such dangerous antagonists as the walrus, and are most apathetic in their habits. When roused from sleep they open their mouths in a threatening manner, but do not seem to think of using their teeth, and if they find that their disturbers do not run away, they take that office upon themselves, and move off deliberately for the water. As they proceed their huge bodies tremble like masses of jelly, in consequence of the fat with which they are so heavily laden. So plentiful is this fat, that a single adult male will furnish about seventy gallons of clear and scentless oil.

The extraordinary development of the nose, which gives so weird-like a character to the aspect of the Elephant Seal, is only found in the adult males, and even in them is not very perceptible unless the animal is alarmed or excited. While the creature is undisturbed, the nose only looks peculiarly large and heavy. As soon, however, as the animal becomes excited, it protrudes this proboscis-like nose, blows through it with great violence, and assumes a very formidable appearance. The female is entirely destitute of this structure, as may be seen in the figure that occupies the background of our illustration. Except for its enormous dimensions the female might be taken for an ordinary Seal. In the male the hood does not make its appearance until the third year.

The Elephant Seal is easily tamed when taken young, and displays great affection towards a kind master. One of these animals was tamed by an English seaman, and would permit its master to mount upon its back, or to put his hand into its mouth, without doing him any injury.

The teeth of this animal are very curious in their formation, especially the molar teeth, which are small, and pointed with a kind of mushroom-like apex. The canines are very large. The whisker hairs are very coarse and long, and are furnished with a raised margin, which gives them the appearance of being twisted like a screw. The food of the Elephant Seal is supposed to consist chiefly of cuttle-fish and sea-weed, as the remains of both these substances are generally found in the stomachs of those that are killed.

OTARIIDÆ;

OR, EARED SEALS.

THE family *Otariidæ*, Eared Seals, are distinguished by having an external ear. The arms and legs are much more developed, and resemble more those of land quadrupeds. Especially is this the case with the hind legs. In the Common Seals the hind legs we have seen are "flippers," directed backwards for swimming; those of the present Seals are articulated so that the limb is capable of being used in walking (after a homely fashion), as well as in swimming. The fore-feet are fin-like, but large, and quite useful in walking. The present group of Seals are, then, a shade higher in rank or development in the direction of the land quadrupeds, or mammals. Eared Seals are characterized by their under fur, an article now well known, and of immense commercial importance.

It is a curious circumstance that the young of these Seals have to be taught to swim. The young are brought forth far inland.

The Sea Lion and Sea Bear are represented by grand specimens in the Central Park Museum, both male, female, and young.

Capt. Bryant spent some time on the island of St. Paul, making some very intelligent records of the habits of these animals. About the first of April, when the snow is cleared away, and the drift-ice has passed, a few old males, of the Sea Bear species, are seen reconnoitering the locality, and after two or three days' inspection venture on shore to examine the rookeries, as they are called. After a few days other "bears" begin to arrive, the first having departed to give intelligence that all is right. The old males appropriate the spaces they require for ten or twelve females each. Capt. Bryant gives some most extraordinary statements respecting the treatment of the females. He says: "As soon as the female reaches the shore, the nearest male goes down to meet her, meanwhile making a noise like the clucking of a hen. He bows and coaxes her, and when he has gotten himself between her and the water, alters his tone, and growls lustily at her, and drives her into his harem." He says the males teach the young to swim.

The Fur Seals, according to Capt. Scammon, U. S. Revenue Marine Service, differ considerably in habits from the other forms. They range from the highest navigable latitudes to the equator.

On the coast of Chili their numbers were so great in 1798 that the American ship *Betsey* procured a full cargo of skins. It was estimated there were left on the island, which is not over twenty-five miles in circumference, at least 500,000 Seals. Subsequently there were taken but little short of a million skins. This fishery was almost exclusively under the American flag.

The capture of Fur Seals is accomplished by driving herds some distance inland. The more valued young or middle-aged are selected, and driven by parties making all the noise they can, on tin implements, and by the opening and shutting of umbrellas.

After resting a while the animals are killed by a sharp blow upon the nose, which part we have seen is especially tender and vulnerable, though in other respects they are quite tenacious of life. Besides the valued skins, each Seal yields a gallon and a half of oil. The linings of the throat are saved and salted, as an article of trade to other ports, being used by the natives to make water-proof cloaks.

The skins are salted and packed in square bins, where they lie about forty days; they are then taken out, the salt removed, and a small quantity of clean salt sprinkled upon them, when they are folded, flesh-side in, and packed for commerce.

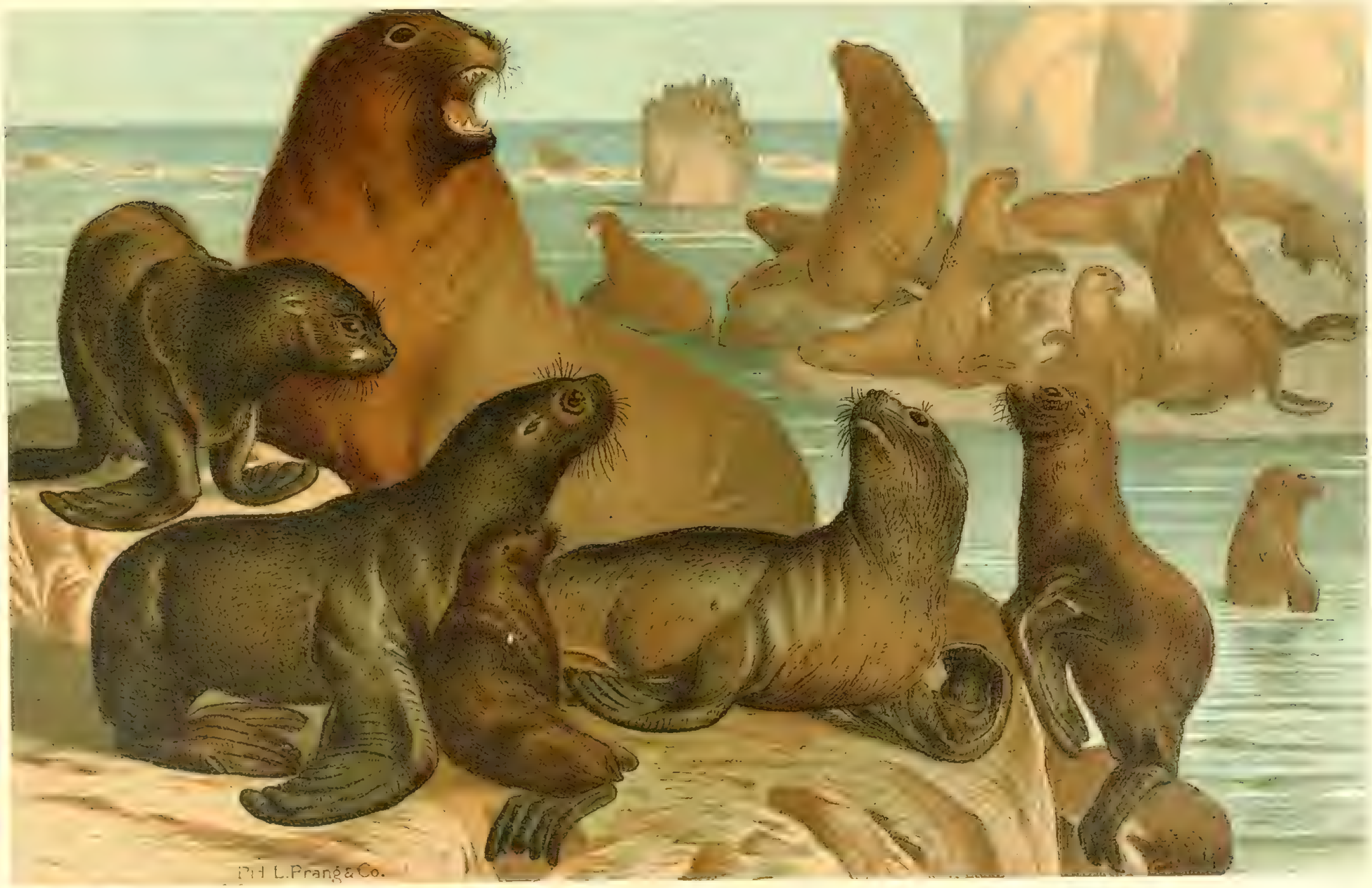
There are about twelve miles of sea-coast occupied by Fur Seals on St. Paul's Island, with an average width of fifteen rods. Allowing twenty Seals to a square rod, the number of breeding Seals are computed at the enormous figure of one million one hundred and fifty-two thousand. Deducting one-tenth for males, leaves one million thirty-seven thousand eight hundred. The value of the skins at the trading posts is ten cents per skin, the company finding bins and salt. Previous to 1866 the skins were worth three dollars each. Soon after the territory was transferred to the United States the skins were worth seven dollars each; and this advance was owing to the fashion for the fur, which then commenced to reign.

SEA LION.—*Otaria jubata.*

The Sea Lion, of Kamtschatka and the Kurile Islands, is of less gigantic proportions than the sea elephant, measuring about fifteen feet in length, and weighing about sixteen hundred pounds. The color of the male Sea Lion is a reddish-brown, which becomes paler after the animal is advanced in years. Upon the neck and shoulders is a heavy mass of stiff, curly, crisp hair, which bears some resemblance to the mane of the lion, and has earned for the creature the name of Sea Lion. The female is destitute of this mane, and her fur is sometimes chestnut and sometimes ochry-brown.

It is not exclusively confined to the localities above mentioned, but is sometimes seen off the coast of Northern America, in the month of July. During the autumn the Sea Lions are found in very great numbers upon the shores of Behring's Island, where they assemble for the purpose of rearing their young through the first few weeks of their life. They are polygamous, but restrict themselves to three or four females.

They are naturally quiet and peaceable animals, permitting the approach of mankind with great indifference, and suffering themselves to be roughly treated before they will condescend to move from the spot on which they may happen to be lying. The hunters make easy prey of these slothful animals, which are not so active as the elephant Seal, nor so fierce as the walrus. The females seem to be more apathetic respecting their cubs than is generally the case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SEA LION.

among Seals, and will frequently relinquish their offspring in their haste to escape from their human foes. The natives are in the habit of killing the Sea Lions by poisoned arrows, or by harpoons. As the wounded animal would be sufficiently strong to escape in spite of the harpoons, the native hunters attach the harpoon-line to a post firmly planted in the ground, and are thus enabled to delay the Sea Lion until they can inflict a fatal wound.

They are marvellously blatant animals, keeping up a continual chorus of vociferations as long as they are on land. The old males are the most noisy of the party, snorting discordantly, and roaring like magnified lions. The females answer by loud bleatings, and the young of both sexes add their voices in a less degree. The united cries of a large herd of Sea Lions are so deafening, that human senses are almost stunned by the clangorous uproar.

This species is said to feed upon fish and smaller Seals, being extremely dreaded by the latter animals, and ruling supreme in its own domains. The teeth of the Sea Lion are very singular in their shape and arrangement, the molars being furnished with sharp trenchant points, some of the incisors double-headed, and others long and pointed like canine teeth.

SEA BEAR, OR URSINE SEAL.—*Arctocephalus ursinus.*

As the mane-clad neck and shoulders of the preceding animal have earned for it the title of Sea Lion, so the generally ursine aspect of the present species has gained the name of SEA BEAR.

It is not a very large animal, being hardly eight feet in length. As its limbs are larger and better developed than in the generality of the Seals, it can stand and walk in a more active manner than any of the preceding members of the phocine family. The color of its fur is very pleasing, the long hairs being of a grayish-brown, while the thick soft wool that lies next to the skin is reddish-brown. The fur is extremely soft and warm, and of high value as an article of commerce. When it is dressed by the furriers, the entire coating of long hairs is removed, the wool only being left adherent to the skin. Upon the neck and shoulders of the male animal there is a kind of mane, composed of rather stiff hairs about two inches in length, and of a grizzled aspect, the hairs themselves being jetty-black, and their tips white. The whole of the fur is thick and long, and does not lie closely to the body.

It is not so easily caught as the sea lion, for it is not only very active in the water, but can proceed upon land with such rapidity that a man who wishes to overtake an affrighted Sea Bear will be forced to exert his utmost speed before he can attain his object.

The Sea Bears are found in great numbers about Kamtschatka and the Kurile islands, and at the beginning of summer are so numerous as to blacken the banks on which they repose.

Being polygamous, the male is extremely jealous, and will not suffer any strangers to approach the limits of his own family. The entire sea-beach is therefore mapped out, so to speak, in little domains, each belonging to a separate family, and guarded with the most jealous care. As the number of females over which a single male bears sway is about forty to fifty on an average, it will be seen that the family must be very extensive when the young are added to their number. From one hundred to a hundred and twenty is not at all an uncommon number for a single family of Sea Bears.

No family will allow the members of another household to crouch upon their territories, and it is very seldom that such an attempt is made. Sometimes, however, trespassers are detected, and then there is a general fight upon the beach, in which the animals of both sexes and all ages fight with great fury. They will not even permit a human being to encroach upon their domains, but advance upon him with such threatening cries and such menacing display of gleaming teeth that he is forced to make his escape as he best can. One traveller was so hard beset by these animals that he was fain to climb a rock which they could not surmount, and was watched by them for nearly six hours before he could make good his escape.

Sometimes an old Sea Bear is seen lying alone in solitary state, not permitting any living being to approach him, and continually uttering low, savage growls.

The males are very tyrannous in their behavior to their wives, and treat the poor submissive creatures very cruelly. If a mother should happen to drop her cub as she is carrying it off, the male immediately turns upon her and bites her as a punishment for her offence. These animals seem to be very intelligent, and have a great variety of intonations, by which they can express their meaning so clearly that their language can even be understood by human ears. Their general voice is something like the lowing of a cow, but when they are wounded, they utter long plaintive cries like that of a suffering dog.

The food of this species consists of sea otters, small Seals, and other animals, which hold it in great terror. The Sea Bear, however, stands in considerable awe of the sea lion, and does not exercise the same indisputable sway as that animal. The name Arctocephalus is of Greek origin, and signifies "bear-headed."

WHALES.

The Cetacea, or Whales, are more thoroughly aquatic than any other animals which have already been described, and are consequently framed in such a very fish-like manner that they have generally been considered as fishes by those who were but little acquainted with the animal kingdom. The entire livelihood of the Whale is obtained in the waters, and their entire structure is only fitted for traversing the waves, so that if they should happen to be cast upon the shore they have no means of regaining their native element, and are sure to perish miserably from hunger.

With the seals, the young are produced upon the land, and there nurtured until they have attained sufficient strength to enable them to cope successfully with the sea waves, and are, moreover, attended in their marine excursions by their mothers, who exercise a watchful guard over their offspring. The young Whale knows no such terrestrial nurture, but is at once received into the bosom of the ocean, being capable from its very birth of accompanying its parent in her paths through the waves.

Although the Whales bear so close a resemblance to the fish, and are able to pass a considerable time below the water, they possess no gills through which they may respire and renew their blood through the agency of water, but breathe atmospheric air in the same manner as the other mammalia. If a Whale were to be detained below the surface of the water for too long a period it would be inevitably drowned, a fact which was once curiously exemplified by the death of a Whale which had entangled itself in a rope fastened to a dead and sunken Whale, and which was found drowned when the rope was drawn to the surface. No injury had been inflicted upon the animal, but it had not been able to disengage itself from the detaining cord in time to breathe, and was consequently suffocated.

When the Whales breathe, they are forced to rise to the surface of the sea, and there make a number of huge respirations, which are technically called "spoutings," because a column of mixed vapor and water is ejected from the nostrils, or "blow-holes," and spouts upwards to a great height, sometimes as much as twenty feet. In order to enable the animal to respire without exposing itself unnecessarily, the "blow-holes" are placed on the upper part of the head, so that when a Whale is reposing itself on the surface of the sea, there is very little of its huge carcase visible, except the upper portion of the head and a part of the back. The "spoutings" are made with exceeding violence, and can be heard to some distance.

The mode of respiration is, however, rather different from that of the generality of mammalia, being modified in order to meet the peculiar circumstances in which the animal is placed.

In nearly all the mammalia the movements of respiration take place in rather rapid succession, and are continuous in their action, and if they are checked for only a few minutes, the result is inevitably fatal. It is evident, however, that as the Whales are forced to seek their food in the depths of the ocean, and to remain for a considerable space of time below the surface, their respiration must be conducted on a different system. The mode which is adopted is truly one of the most marvellous contrivances that can be imagined, and is so beautifully simple, as well as profound, that it raises our highest adoration of the unspeakable wisdom which planned it.

It is clear that the creature would not be able to take a supply of air into the depths of the ocean, and that another means must be found for oxygenizing the blood.

As, therefore, the animal is unable to breathe below the surface of the water, the difficulty is surmounted by furnishing it with a large reservoir of arterial blood, which is oxygenized during the short time that is occupied in the "spoutings," and which supplies the circulation until the Whale returns again to the upper regions for a fresh supply. The reserved blood is contained in a large mass of vessels which line the interior of the chest and the adjoining regions, and are capable of containing a sufficient amount of fresh blood to sustain life for a wonderfully long period.

As the Whales are in the habit of descending to very great depths—depths so profound, that if a piece of dry wood be equally deeply sunk it will be saturated with water, and will not float—their ears and nostrils must be guarded against the dangers that would arise from the penetration of the water into their cavities. There is consequently a beautifully simple and ingenious valvular structure, which perfectly answers this purpose, and firmly closes the external orifices in proportion to the depth to which the animal dives. The ear is remarkably small, and in some specimens is almost undiscernible. Some anatomists are of opinion that the Whales can hear by means of the communication of the ear with the mouth. As the spermaceti Whale is capable of communicating with its companions at a distance of several miles, it is evident that the sense of hearing must be better developed than would be the case if the creature were totally dependent for hearing on the external orifice ; which must always be closed while under water, and which in many species is covered with the external integument.

The limbs of the Whales are so modified in their form that they can hardly be recognized by their external appearance alone as the limbs of a veritable mammal. In shape they closely resemble the fins of fish, and it is not until they are stripped of the thick skin which envelops them that the true limb is developed. The reader may see the bony structure of the Whale's fin by referring to the skeleton of the rorqual on page 391. The chief use of these organs seems to be that they assist the animal in preserving its position in the water, for the huge carcase rolls over on its back as soon as it is deprived of the balancing power of the fins. They are also employed for the purpose of grasping the young whenever the mother Whale is anxious for the safety of her offspring, but they are of little use in urging the animal through the water, that duty being amost entirely performed by the tail.

This member is very curious in its structure, for, as may be seen by reference to the rorqual skeleton, the Whales have no hinder limbs that may be modified into fins, as is the case with the seals, and are forced to depend solely on the soft structures for its powers of locomotion. The traces of hinder limbs are to be found in some little bones that lie loosely in the flesh, but they are of no real use, and are only representatives of the true limbs.

The tail of these animals is an enormously powerful organ, set transversely upon the body, and driving the creature forward by its powerful vertical sweeps. With such wonderful strength is the tail endowed, that the largest Whales, measuring some eighty feet in length, are able by its aid to leap clear out of the water, as if they were little fish leaping after flies. This movement is technically termed "breaching," and the sound which is produced by the huge carcase as it falls upon the water is so powerful as to be heard for a distance of several miles. The length of the tail is, in the larger Whales, about five or six feet, but it is often more than twenty feet in breadth. The substance of the tail is remarkably strong, being composed of three layers of tendinous fibres. When taken from the animal it is largely used in the manufacture of glue.

The skin of the Whales is devoid of hair, and is of a rather peculiar structure, as is needful to enable it to resist the enormous pressure to which it is constantly subjected at the vast depths to which the animal descends. The skin is threefold, consisting first of the scarf-skin, or epidermis; secondly, of the rete-mucosum, which gives color to the animal; and thirdly, of the true skin, which is modified in order to meet the needs of the creature which it defends. The blubber, indeed, is nothing more than the true skin, which is composed of a number of interlacing fibres, capable of containing a very great amount of oily matter. This blubber is never less than several inches in thickness, and in many places is nearly two feet deep, and as elastic as caoutchouc, offering an admirable resistance to the force of the waves and the pressure of the water. In a large Whale the blubber will weigh thirty tons.

None of the Whales are able to turn their heads, for the vertebræ of the neck are fused together into one mass, and compressed into a very small space.

The order *Cetacea*, from the term *ceta*, meaning a Whale—the latter being from the Anglo-Saxon *hwal*—embraces a very interesting and wonderful group of creatures. Confined to the waters, and formed like the finny denizens of the deep, they are quite naturally regarded as fishes by the casual observer. Little anatomical knowledge is required, however, to understand their true position; indeed, one physiological fact, which is most easily determined by any one who witnesses the living Cetacean, settles the matter without qualification; they breathe the external air through lungs, and not by aid of gills as in fishes. Again, Whales suckle their young, and, consequently, are of the great class of which man is the head, the Mammalia.

Whales are grouped primarily into several sections, or families. The one usually regarded as ranking first, is that including the Whalebone Whales, *Balænidæ*, so called, Balæna being another name for whalebone. The Cachelots, or Sperm Whales, form another group.

There is nothing notably different in the internal organization of Whales from that of land animals, excepting the development of large series or net-work of arteries, within which the blood is reserved in large volumes, to serve when the creature remains under water any considerable length of time. A large portion of the interior of the chest is lined by these plexuses of blood-vessels. The nostrils are situated on the highest point of the head; these so-called blow-holes are thus in the most convenient position for receiving air as the animal rises to the surface. The nostrils communicate directly with the passages to the lungs. A peculiar mechanism in the throat, valvular in character, prevents the water that may be taken into the mouth from passing into the lungs. The figures of Whales have from the earliest time been represented as "blowing" water from the nostrils. It is impossible for such a feat to be performed by any of the species, yet authors persist in allowing their books to perpetuate such an error. The structure is essentially the same as our own, and most certainly no human being can with any degree of success take in water and blow it out in a stream from the nose. What looks like water is the vapor that is forced out when the animal expires; and at the same moment the small quantity of water that chances to be in the valves of the blow-holes is forced upwards. One witnessing the "blowing" of a Whale will readily see that it is mostly vapor, for it floats away like smoke; if it were water, the volume would fall downwards.

Captain Scoresby, an English Whaler of many years' experience, is the most reliable authority on this subject, and has contributed more towards its literature than any person. He says the Whales have no voice, yet others think that some species have a sort of bellowing voice. The seals, we are well aware, have most potent voices; some of the most discordant kind.

The brain of the Whale is comparatively small; one of a specimen measuring nineteen feet in length, weighed only three pounds and twelve ounces; that is one three-thousandth part of the whole body. This is only about two-thirds the weight of the largest human brain. The Porpoises and Dolphins have a larger brain.

The senses of Whales are considerably beyond our comprehension. With regard to smell, there is reason to believe it has a good degree of this sense.

The organ of vision is extremely small, comparatively. The largest Whale has an eye not larger than that of an ox.

The ear is not developed externally. By careful examination in the vicinity of the eye, a minute aperture is found not larger than an eighth of an inch in diameter; this corresponds to the external ear.

The young are brought forth in much the same manner as those of land mammals. The period of gestation is supposed to be about nine months. The natural term of life is thought to be from twenty to a hundred years.

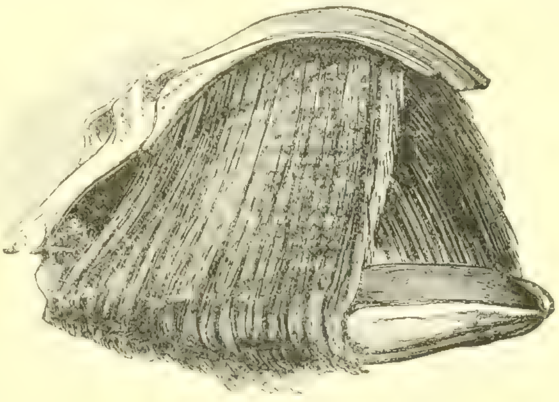
The amount of oil yielded by the larger kind of Whales reaches nearly twenty tons.

The peculiar substance called ambergris is common to all. It is a secretion produced in the intestines.

The size of Whales is a subject of much misapprehension. Captain Scoresby says:

"Of three hundred and twenty-two individuals, in the capture of which I had personally been concerned, no one, I believe, ever exceeded sixty feet in length—and the largest I measured was fifty-eight."

The immense bulk of the Whalebone and Sperm Whales is more surprising than their length.



SKULL OF GREENLAND WHALE.
(To show the Whalebone.)

The Greenland Whale, Northern Whale, or Right Whale, as it is indifferently termed, is an inhabitant of the Northern Seas, where it is still found in great abundance, although the constant persecutions to which it has been subjected have considerably thinned its numbers.

This animal is, when full-grown, about sixty or seventy feet in length, and its girth about thirty or forty feet. Its color is velvety black upon the upper part of the body, the fins and the tail; gray upon the junction of the tail with the body and the base of the fins, and white upon the abdomen and the fore-part of the lower jaw. The velvety aspect of the body is caused by the oil which exudes from the epidermis, and aids in destroying the friction of the water. Its head is remarkably large, being about one-third of the length of the entire bulk. The jaw opens very far back, and in a large Whale is about sixteen feet in length, seven feet wide, and ten or twelve feet in height, affording space, as has quaintly been remarked, for a jolly-boat and her crew to float in.

The most curious part of the jaw and its structure is the remarkable substance which is popularly known by the name of Whalebone. This substance is represented in its natural position in the accompanying illustration, which is taken from a photographic portrait of the skeleton in the great Museum of Comparative Anatomy at the Jardin des Plantes.

The Whalebone, or baleen, is found in a series of plates, thick and solid at the insertion into the jaw, and splitting at the extremity into a multitude of hair-like fringes. On each side of the jaw there are more than three hundred of these plates, which in a fine specimen are about ten or twelve feet long, and eleven inches wide at their base. The weight of baleen which is furnished by a large Whale is about one ton. This substance does not take its origin directly from the gum, but from a peculiar vascular formation which rests upon it. These masses of baleen are placed along the sides of the mouth for the purpose of aiding the Whale in procuring its food and separating it from the water.

The mode of feeding which is adopted by the Whale is as follows. The animal frequents those parts of the ocean which are the best supplied with the various creatures on which it feeds, and which are all of very small size, as is needful from the size of its gullet, which is not quite two inches in diameter. Small shrimps, crabs and lobsters, together with various mollusks and medusæ, form the diet on which the vast bulk of the Greenland Whale is sustained. Driving with open mouth through the congregated shoals of these little creatures, the Whale engulfs them by millions in its enormous jaws, and continues its destructive course until it has sufficiently charged its mouth with prey. Closing its jaws and driving out through the interstices of the Whalebone the water which it has taken together with its prey, it retains the captured animals which are entangled in the Whalebone, and swallows them at its ease. The multitude of these little creatures that must hourly perish is so enormous, that the prolific powers of nature would seem inadequate to keep up a supply of food for the herds of Whales that inhabit the Northern Seas. Yet the supply is more than equal to the demand, for the sea is absolutely reddened for miles by the countless millions of living beings that swarm in its waters.

The Whale is an animal of very great value to civilized and to savage men. The oil which is procured in great quantities from its blubber and other portions of its structure is almost invaluable to us, while the bones and baleen find their use in every civilized land. To the natives of the polar regions, however, the Whale is of still greater value, as they procure many necessaries of life from various parts of its body, eat the flesh, and drink the oil. Repulsive as such a diet may appear to us who live in a comparatively warm region, it is an absolute necessity in these ice-bound lands, such oleaginous diet being needful in order to keep up the heat of the body by a bountiful supply of carbon.

Civilized beings, even though they may be living for the time in these northern regions, find themselves almost unable to join in the greasy banquet which so entirely delights the native palate. There are, however, some portions of the Whale which can be eaten without difficulty, and are rather palatable than otherwise. The skin of the Whale, when properly dressed, is of ebony blackness, and not at all attractive to the eye. But its flavor is quite agreeable, and is said to bear some resemblance to that of the cocoa-nut. When prepared for the table it is cut into little cubes like black dice. But the best part of the Whale is one that would hardly be expected to form an article of diet, namely the portion of the gums in which the roots of the baleen are still imbedded. The Tuskis call this substance their sugar, though its flavor is very like that of cream-cheese. One traveller who had been obliged, through motives of politeness, to take part in a native banquet, and who had been more than disgusted by the very remarkable dishes which were brought to table, became quite enthusiastic on the merits of Whale's skin and gum, acknowledging himself to be agreeably surprised by the former, and calling the latter article of diet "perfectly delicious."

The chase of the Whale, its dangers and its excitement, are too well known to need description in these pages, and only as far as they form part of the animal's history will they be noticed.

In its character the Greenland Whale is inoffensive and timorous, and except when roused by the pain of a wound or by the sight of its offspring in danger, will always flee the presence of man. Sometimes, however, it turns fiercely upon the boat from which the fatal weapon has been launched, and with a single blow of its enormous tail—its only weapon—has been known to shatter a stout boat to fragments, driving men, ropes, and oars high into the air. It is a very affectionate animal, holding firmly to its mate, and protecting its young with a fearlessness that is quite touching to any one except a whaler, who takes advantage of the poor creature's natural affection to decoy the mother within reach of his harpoon.

As far as is yet known, the Greenland Whale produces only a single cub at a birth. When first born, the young Whale is without the baleen, depending upon its mother for its subsistence like any other young mammal. The maternal Whale keeps close to her offspring until the baleen is grown, and does not forsake it until it is capable of supporting itself. The young Whales, before the baleen has developed itself, are technically termed "suckers," and when the baleen is six feet in length, they are called by the name of "size."

The tongue of this Whale cannot be protruded from the mouth, as it is fixed throughout its entire length. It is very large, soft, and full of oil, so soft, indeed, that a man can make a depression deep enough to contain his closed fist by a tolerably strong pressure ; as I can testify by personal experience. The bones are porous and are very full of oil, the jawbones being so heavily charged with this valuable substance that they are removed from the animal, and so fastened in the rigging as to permit the oil to drain from them.

When the Greenland Whale is undisturbed, it generally remains at the surface of the water for ten minutes, and "spouts" eight or nine times. It then descends for a short time, from five to twenty minutes, and returns again to the surface for the purpose of respiration But when harpooned, it dives to a very great depth, and does not return to the surface until half an hour has elapsed. By noticing the direction of the line which is attached to the harpoon, the whalers judge of the spot in which the creature will rise, and generally contrive to be so near their victim when it emerges that they can fix another harpoon,or strike it with a lance before it can again descend into the depths of the ocean.

Several species of the genus Balæna are found inhabiting the different oceans of our globe, such as the Western Australian Whale, the Cape Whale, the Japan Whale, the New Zealand Whale, the Scrag Whale, and others, of which the best known is the Cape Whale, or Southern Whale, as it is sometimes called.

This animal attains a considerable size, reaching the length of seventy feet when full grown, the length of its head being sixteen feet. It inhabits the Southern Ocean, and is often seen in the bays that adjoin the Cape of Good Hope in the months of June, July, and August, as the female is in the habit of frequenting these localities during the infancy of her young. The males are very seldom seen near their mates, so that out of sixty Cape Whales that were killed in False Bay only one was a male. The color of this animal is a uniform black.

The *Balænidæ*, or Family of Whalebone Whales, is represented by few species. The principal characteristic of this group is the series of whalebone plates situated in the upper portion of the mouth. These plates are called baleen, hence the family designation.

Though this is one of the largest creatures, yet its food is of the delicate jelly-animals that form vast areas upon the surface of the ocean. The œsophagus or "swallow" of these Whales is no larger than one's fist, which shows that the jelly-food is natural to it. In feeding, the Baleen Whales open the mouth widely, and rush through a mass of jellies, filling the mouth with both food and water. A valvular arrangement prevents the passage of water into the stomach, while the tongue presses the food against the roof of the mouth. This action forces the water out through the baleen plates, which acts as sieves. The morsel is then swallowed.

These Whales are remarkable for the comparative size of their heads ; that of the *Balæna mysticetus*, or Greenland Whale, being one-third its whole bulk.

The Greenland Whale (*Balæna mysticetus*), called also the Common Whalebone Whale, is the most familiar cetacean known, especially as it is the notable creature that supplies our burning-oil in such immense quantities. It is known to the "toilers of the sea" as the Right Whale, and this because it is the right one to kill, as distinguished from other less desirable species.

The Bow-head and Great Polar Whale are terms also applied to this animal. Captain Scoresby's figure of the Polar Whale is incorrect as to its tail, or "small" of body. His figure, which has served for all others up to the present time, shows the tail uplifted. The true figure should give a shorter "small." The tail of this Whale cannot be bent, as in his figure. All published figures of this Whale, save Captain Scammon's, are incorrect.

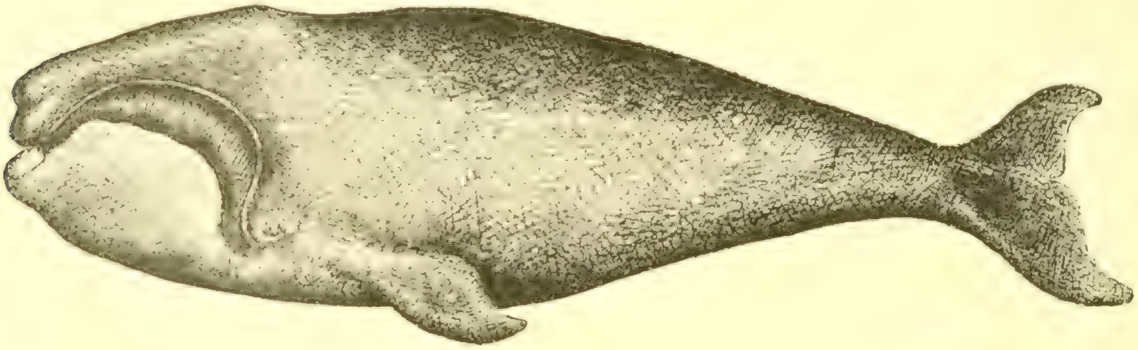
The ATLANTIC RIGHT WHALE (*Balæna cisarctica, Cope*) is a rediscovery in one sense. About the time of the first settlement of this country, our forefathers found the aborigines pursuing this Whale for the several purposes of half-civilized life.

Soon the whites found the oil and baleen valuable articles of commerce, and small vessels were fitted out to capture the Whales in greater numbers. At the period of our Revolution, this Whale had become nearly extinct, and our whalers had pushed northwards, where they supposed they had found larger specimens of the same species. The truth is, however, the Whale they had been capturing was one adapted by nature to live in temperate waters, and the persistent pursuit of them had resulted in their extinction, nearly.

The Right Whale they now found in the Arctic regions, is one adapted to the cold waters, and is never seen out of them. The seamen cared little about species so long as the new Whale gave them larger baleen and more oil. Consequently, as there were no students of marine zoology in those days in our country, the Atlantic Whale escaped scientific treatment, though it is now known that this is the same as the Biscay Whale, so long the object of pursuit by the Basques.

The Atlantic Whale, not being extinct, has lately shown itself in several examples. The first one examined by science was a young one, and Professor Cope, of Philadelphia, named it as above: *cisarctica*, meaning that its *habitat* is this side of the Arctic seas, as it was found to be confined to the temperate Atlantic.

There are few specimens of this Whale known. The American Museum, in Central Park has a skeleton of a full-grown one, the carcase of which was thrown ashore on Long Island. In 1882, one of these Whales was captured off Montauk Point, Long Island, and brought into New York harbor, where it was exhibited. This was the first adult ever examined for scientific purposes. It was a female, and measured forty-eight feet in length. We had the pleasure to make a thorough examination of this Whale, which, in view of the unique circumstances, was likely to prove very acceptable to science. Soon after this specimen was examined, and a description of it was drawn up for publication in the fourth *Bulletin* of the American Museum of Natural History, Dr. Manigault, of Charleston, S. C., informed the writer of an adult male that he had examined. This Whale was captured in Charleston harbor, and the skeleton was preserved in the Museum of Charleston Medical College. This occurrence was most fortunate, as the characteristics of both sexes were recorded in the *Bulletin*, with a drawing of the skull of the latter and its baleen.



ATLANTIC RIGHT WHALE.—*Balæna cisarctica* (Cope).

Here, then, is a valuable record of this rediscovered species. A drawing of the exterior of the female is included, made from the creature as it lay at the pier in New York, and a drawing of the skeleton of the one found on the Long Island shore.

The baleen of this species is far inferior to that of the Arctic Whale. It is shorter, and is coarse in fibre. That of the latter is a good portion of the value of a captured whale; its length being sometimes twelve feet.

This Whale was known to the sea-faring people of Europe in ancient times as Nordcaper, as it was captured near the North Cape of Iceland; this being its northernmost limit.

While this edition was passing through the press, a most unexpected accession to the few examples of this Whale known to Science has occurred. The old whalers of Southampton, Long Island, espied lately, during the coldest days of this unusually cold winter, the "blowing" of several Right Whales. Boats were fitted out at once. and Capt. Edwards, a veteran whaler, and the one who captured the first adult Atlantic Right Whale, a figure of which we herewith present, led the chase. The men secured four, including, we understand, a young one. We regret that the ample preparations we have established to get full particulars of the specimens have not as yet furnished any response. It is a matter, however, of great interest to know that this rare Whale is undoubtedly increasing in numbers. One of this shoal is reported as about fifty feet in length, which is probably the extent of this species.

UNDER the term Scrag Whales, a family is recognized—individuals having rough bunches on their backs. The baleen is white, and is only about one foot in length.

The Scrag Whale (*Agaphelus gibborus*) is the only species yet described. It inhabits the Atlantic Ocean. It was known to the early settlers of New England.

The California Gray Whale (*Rachianectes glaucus, Cope*) is recorded, but little is known of its history or peculiarities. The baleen is short, as in the preceding species.

The Hump-Backed Whales (*Megapteridæ*) are distinguished by having a dorsal fin, and very long pectoral fins. Several species are enumerated.

The Finner or Fin-back Whales (*Physalidæ*) have a high dorsal fin. It should be understood in this connection, that the fins here mentioned are not so called in the sense that those of fishes are, as they are but thickened portions of the skin. The tails of Whales are the same in structure, though muscles are developed in them. The longest Whale known is of this group ; some examples reaching one hundred feet. The Sperm and Right Whales are much more bulky, but their length never exceeds sixty feet.

A large number of species are enumerated.

The Sulphur Bottom Finner is the largest. It is common off the Pacific coast, and in the waters of the Northwest.

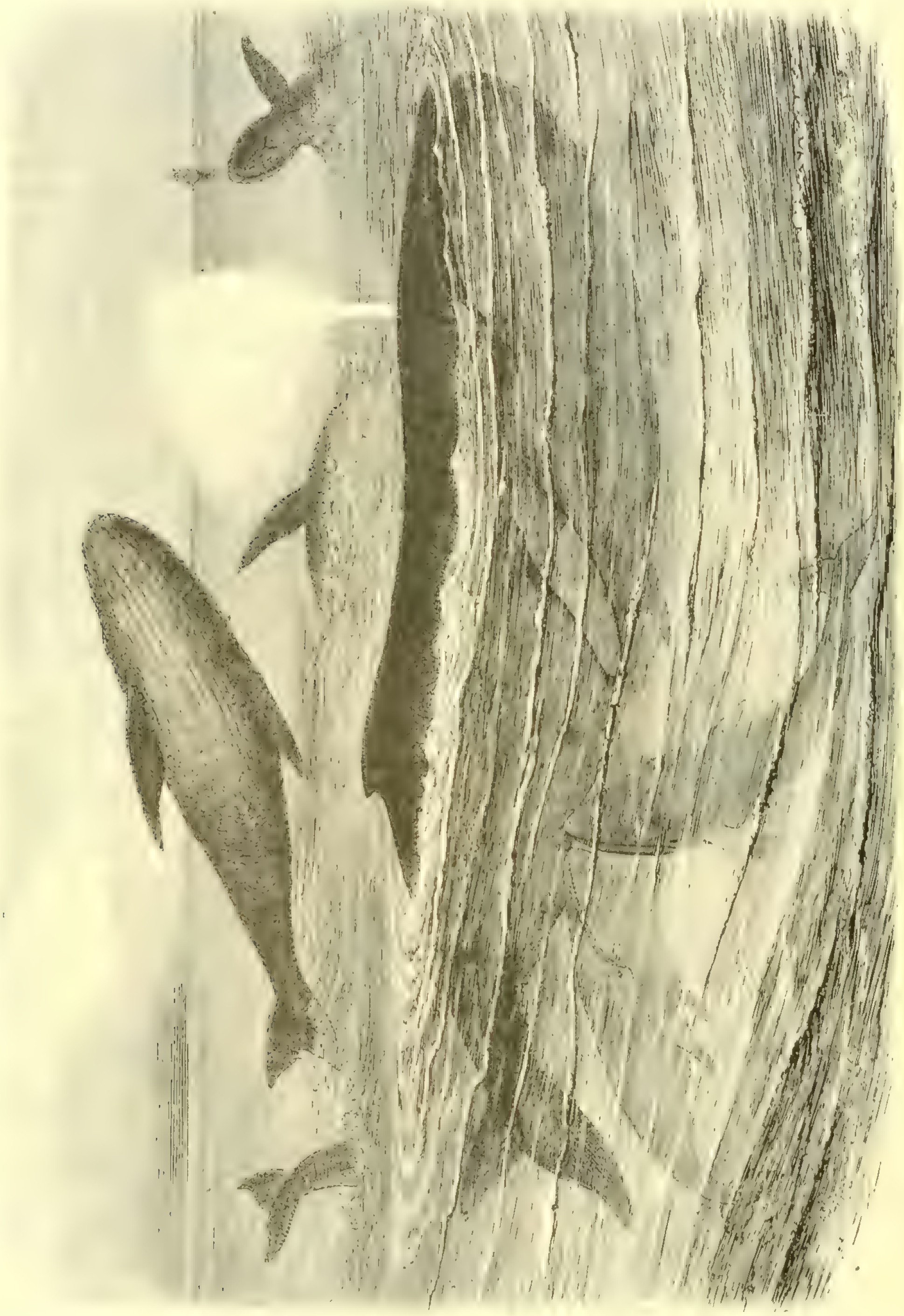
SEVERAL species of the HUMP-BACKED, or BUNCHED WHALES, are now known, although there is very great difficulty in deciding upon the distinctions that are needful for the founding of a species, in animals which are necessarily so far beyond our reach except on rare and limited occasions.

In all these animals the head is rather broad and flattened, and the throat and chest are marked with deep longitudinal folds or "reeves," as they are termed by Dudley in his account of the Bunch Whale. These folds are perceptible even on the sides, and extend as far as the fins. The hump or bunch is of no very great size, being only a foot or so in height, and hardly larger than a man's head. These animals may easily be distinguished from those of the succeeding genus by their shorter and more stout forms, the warty lip, and the large and rounded nose. The skull is about one-fourth of the entire length of the animal.

The species which is figured in the illustration on following page is that of JOHNSTON'S HUMP-BACKED WHALE, a species which frequently attains very considerable dimensions, measuring from sixty to seventy feet in length. In spite, however, of its great size, it is not sought after by the whalers, and even if it should accidentally come across the course is seldom disturbed by them. Its oil, however, is said to be superior to that which is furnished by the Greenland Whale, and not much inferior to the oil of the Sperm Whale.

It is an inhabitant of the Greenland seas, and is said to be found in greater profusion than any other species. It is furnished with baleen, but this substance is of no very great value, being short, and not splitting "kindly," like that of the Greenland Whale. When dry it takes a slight twist. When first born, the young of the Hump Whales are devoid of baleen, but a considerable number of rudimentary teeth are found in both jaws. The spout or blow-holes are situated on the top of the head, and not on the snout like those of the Sperm Whale.

The name Megaptera signifies "great-finned," and is given to this genus on account of the large size to which the pectoral fin extends. This member sometimes measures as much as seventeen feet in length, being equal to the head, or about one-fifth the entire length of the body. When the integument is removed it is seen to be provided with only four fingers. The Latin specific name, *longimana*, signifies "long-handed." In color it is white. The dorsal fins are placed rather low, and behind the middle of the body. This Whale is always infested with sundry parasitic animals belonging to the genera Diadema and Otion.



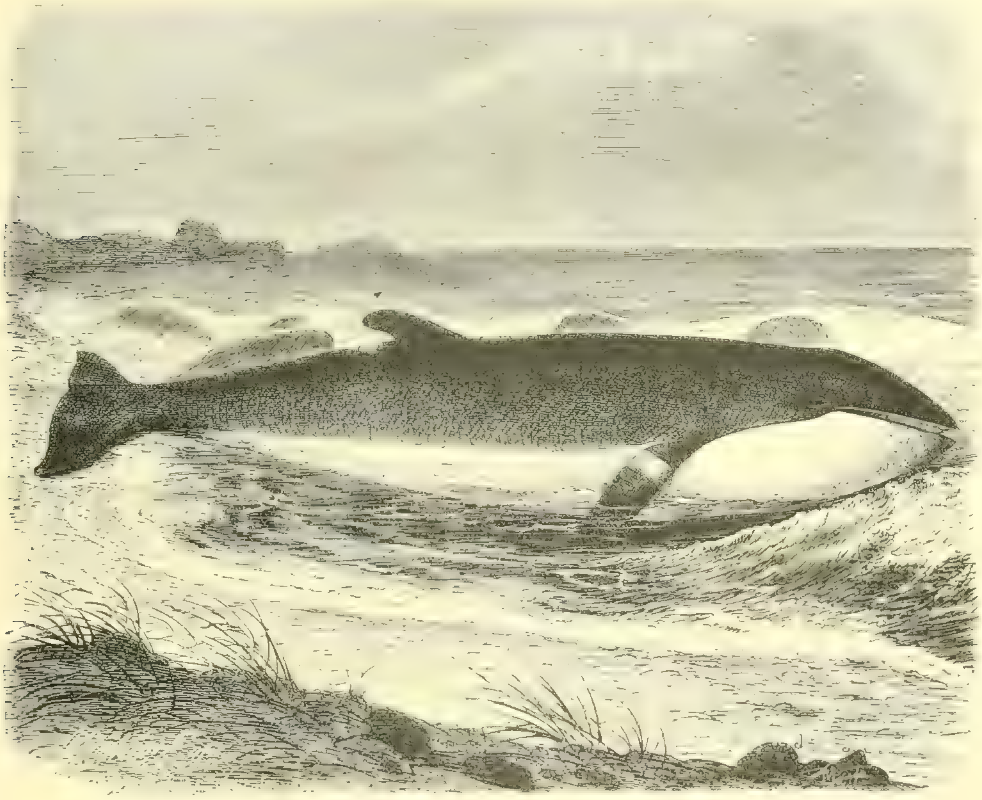
HUMP-BACKED WHALE.—*Megaptera longimana.*

ALL the true carnivorous Whales are remarkable for the great proportionate size of the head. The PIKE WHALE, as may be seen from the illustration, belongs to this group of animals, and in some respects is not dissimilar to the Greenland Whale.

This animal is, however, not nearly so large as the preceding, being only about twenty-five feet in length when adult. It is furnished with baleen, but the plates are comparatively short, and of a slight pinkish hue. The volume of the mouth is made up by a development of the lower part of the mouth into a kind of huge pouch, which is capable of containing a very large volume of water and marine animals. The tongue is not tied down as in the Greenland Whale, but is free towards the apex, and almost as capable of movement as that of man.

It is a native of the seas that wash the coasts of Greenland, and is sometimes seen near Iceland and Norway, descending but rarely into warmer latitudes. The flesh of this animal is in some repute for its delicacy, and is therefore much coveted by the natives of these northern regions. They do not, however, attempt to harpoon the creature, on account of its great activity, but content themselves with inflicting severe wounds with their darts and spears, in the hopes that the wounded animal may die, and may in time be stranded on their coasts. The oil which it furnishes is said to be particularly delicate.

The Pike Whale feeds not only on the little creatures that form the food of the Greenland Whale, but chases and kills the active salmon and other fish. In the stomach of one of these animals have been found the remains of various fish, those of the dog-fish being the most prevalent. The head of this species is elongated and rather flattened, and the throat and chest are furnished with very deep longitudinal folds, which are capable of dilatation to a great extent.



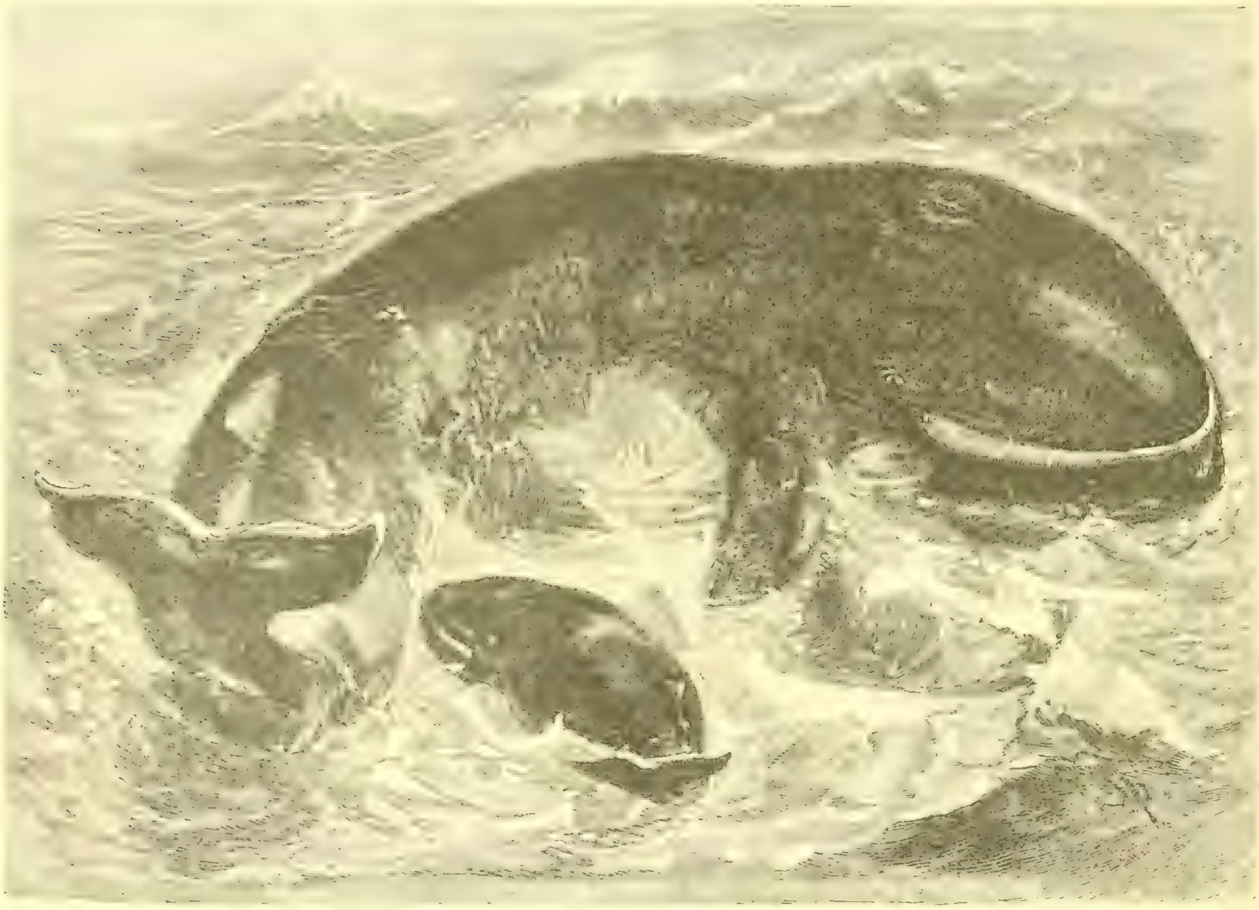
PIKE WHALE.—*Balænoptera rostrata.*

At the extremity of the snout there are eight distinct bristles, arranged in perpendicular rows on the top of each jaw. It has been called by a great number of names by different writers, and is mentioned by various authors under no less than seventeen distinct titles. The color of this animal is black upon the upper parts of the body, and white on the abdomen, tinged with a reddish hue. The pectoral fin is almost entirely dark, but changes into white on its upper surface, near its base.

The name Balænoptera signifies "Finned-Whale," and is given to the animal on account of the size of the pectoral fins.

A GIANT among giant forms, the huge RORQUAL roams the Arctic seas at will, seldom molested by the hunter, and scarcely ever captured.

The bulk of this animal is greater than that of any other Whale, as many specimens have been known to attain a length of more than one hundred feet, and one or two have reached the extraordinary length of one hundred and twenty feet. By inexperienced whalers it is sometimes mistaken for the Greenland Whale and harpooned, but is very seldom killed; for the creature is so remarkably active and fearless, that in many cases the aggressors have paid dearly for their error by a crushed boat and the loss of several lives. On one such occasion the Rorqual started off in a direct line, and at such a speed that the men lost their presence of mind, and forgot to cut the rope that connected the Whale with the boat. Making directly for a neighboring ice-field, the Rorqual shot under it, and drew the boat with all its crew beneath the ice, where they disappeared forever from the gaze of mankind.



RORQUAL.—*Balænoptera boöps, Physalus antiquorum.*

Mr. Scoresby, desiring to secure one of these powerful animals, made preparations for the chase by employing very short lines, only two hundred fathoms in length, and attaching a buoy to each of their extremities, in order to tire out the creature by the resistance which they would offer to the water through which they would be dragged by the Whale.

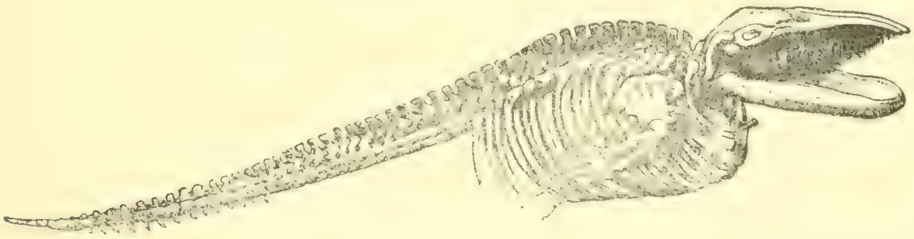
Two Rorquals were struck, and in both cases the intended victims escaped. In the first instance, the Whale dived with such impetuous speed that the line snapped by the resistance of the buoy against the surface of the water, and in the second case the line only held together for a single minute, and was severed apparently by friction against the dorsal fin. A third Rorqual was afterwards harpooned through the error of the seamen, who mistook it for a Greenland Whale. As soon as it felt the sting of the harpoon, the animal dived with such rapidity that it carried nearly three thousand feet of line out of the boat in about a minute of time, and escaped by snapping the rope.

Not contenting itself with such mode of escape, the Rorqual will often turn fiercely upon the boats, and avenge itself by dashing them to pieces by repeated strokes of its fearful tail.

These belligerent qualities would make the whalers very cautious in dealing with such formidable foes, even if their capture were attended with profit equal to the bulk of their prey. But as it is found that the Rorqual is almost valueless when killed, the whalers permit it to pass unmolested, and turn their attention to more valuable quarry. The layer of blubber which encompasses the Rorqual is only about six or eight inches in thickness, and is very chary in yielding oil, a large Whale only furnishing at the best ten or fifteen tons, and sometimes scarcely a single ton of this valuable substance.

As the head of the Rorqual is not nearly so much arched as that of the Mysticetus, and the capacity of the mouth is more owing to the huge pouch of the lower jaws than to the form of the upper jaw, the baleen, or whalebone, is necessarily very short, scarcely reaching four feet in length. Even if its quality had been good, it would be of comparatively little value. Yet it is so coarse and "unkindly" that it is almost valueless for manufacturing purposes. Whalers would rejoice if this substance were of more value, as it is extremely plentiful in the Rorqual, the jaws being lined with five thousand distinct plates or "slabs" of baleen.

As the food of the Rorqual is not limited to the small animals which constitute the diet of the Greenland Whales, but consists also of various fish, it needs that the gullet should be larger than in that creature. In the stomach of a single Rorqual, six hundred large cod-fish have been found, together with a considerable number of pilchards. In order to procure a sufficiency of food for its vast bulk, the Rorqual often follows the shoals of migrating fish until it approaches the shores, where in many cases it prefers to take up its abode, hovering round the fishing-grounds, and swallowing whole boat-loads of herrings, pilchards, and other fish.



SKELETON OF RORQUAL.

Although the Rorqual may for a time support itself at the cost of our fishing-trade, it is nearly sure to fall a victim to its own temerity, and to be left by the returning tide, helplessly and ignominiously stranded on the shores. This is a season of great rejoicing among the fishermen, who flock to the fatal spot with their most deadly weapons, and avenge themselves of their losses by the slaughter of the giant robber. Even the "hollie-pike" himself fell a victim to his want of caution, and was at length stranded on the shores of the very bay which he had haunted for so many consecutive years. The length of this animal was seventy-five feet.

Owing to the persevering manner in which the Rorqual follows its prey to our coasts, it is more frequently stranded upon the British shores than any other true Whale. One of these animals that was thus captured was ninety-five feet in length, and weighed two hundred and forty-nine tons. Its breadth was eighteen feet, the length of the head twenty-two feet. Each fin measured twelve feet six inches in length. The skeleton of this magnificent animal was preserved and mounted, and after the bones were dry, their united weight amounted to thirty-five tons. To procure the skeleton of so large an animal is no easy matter, for the preparation of a Rorqual that was only eighty-three feet in length occupied a space of three years.

The Laplanders, who find the bones and other portions of this animal to be of great service to them, unite in its chase, and employ a very simple mode of action. To harpoon such a being would be useless, so they content themselves with inflicting as many wounds as possible and leaving it to die. After the lapse of a few days the huge carcase is generally found dead upon the strand, and becomes the property of all those who have wounded it and can prove their claims by the weapons which are found in its body. The person who finds the stranded carcase is by law entitled to one-third of the value.

The whalers appear to regard this animal with as much detestation as do the European fisherman, for the Greenland Whale has no love for the Rorqual, and seems to avoid the localities where this marine giant takes up its residence. It does not frequent the more icy seas, but prefers the clear waters. The spoutings of the Rorqual are very impetuous, as indeed are all its actions, and while engaged in respiration it shoots along the surface of the water at a velocity of four or five miles an hour instead of lying still during that process, as is the custom with the Greenland Whale. The color of this species is a dark-gray, tinged with blue.

The name Rorqual is derived from the Norwegian word, which signifies a "Whale with folds," in allusion to the deep longitudinal folds which lie along the under jaw and a considerable portion of the lower parts of the animal. The term Boöps is from the Greek, and signifies "ox-eyed," in allusion to the small rounded ox-like eyes of the Rorqual.

The Rorqual can be distinguished while in the water from the Mysticetus by the comparatively longer and more slender body and more cylindrical form, and by the fact of its possessing a dorsal fin. Its actions too are so peculiar as to mark it out to an experienced eye.

SUB-ORDER ODONTOCETI.

TOOTHED WHALES, SPERM WHALES, ETC.

THE animals which form the next little group of Cetacea are remarkable for their immensely large head with its abruptly terminated snout, and the position of the blow-hole, which is situated upon the fore part of the head, nearly at the tip of the snout.

They do not possess any baleen, but are armed with a most formidable set of teeth in the lower jaw, which fit into a series of conical depressions in the upper jaw. To a casual observer the upper jaw appears to be devoid of teeth, but on a closer examination it is found to possess a short row of them on each side, which are mostly placed nearer the interior of the jaw than the conical depressions already mentioned, but in some instances are found at the bottom of these cavities. The number of the teeth of the lower jaw is very variable, but the average in adult specimens is about fifty-two. The teeth are heavy, strong, and when the animal is young are rather sharply pointed, but become extremely blunt when worn by the attrition of a long course of service. In Europe the teeth of the CACHALOT, or SPERMACETI WHALE, are of no great value, being considered merely as marine curiosities, and often carved with rude engravings representing the chase of the animal from which they were taken, together with a very precise account of the latitude and longitude, and a tolerably accurate view of the vessel. In the South Sea Islands, however, these teeth are articles of the highest value, being thought worthy of dedication to the idol deities, or at least placed as rare ornaments in the king's house. So great is the conventional value of these teeth, that several wars have arisen from the possession of a Whale's tooth by an inferior and unfortunate chief who had discovered the rarity and meant to keep it.

The partly-hidden teeth of the upper jaw are about three inches in length, but they hardly project more than half an inch through the soft parts in which they are imbedded. In preparing the skull of the Spermaceti Whale these teeth are apt to fall out together with the softer parts, as their attachment to the jawbone is very slight. Eight of these teeth have been found on each side of the jaw.

The CACHALOT is one of the largest of the Whales, an adult male, or "old bull," as it is called by the whalers, measuring from seventy to eighty feet in length, and thirty feet in circumference. The head is enormously long, being almost equal to one-third of the total length. The term Macrocephalus is derived from two Greek words, signifying "long-headed," and has been given to the animal in reference to this peculiarity of structure. Upon the back

Animate Creation.

We have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the ANIMAL WORLD, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an ILLUSTRATED NATURAL HISTORY, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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The late CHARLES DARWIN *writes:*—"The illustrations are the best I ever saw in any work. I find it superfluous to enter here into particulars, as I already, in the 'Descent of Man,' have willingly and openly confessed how much I have profited by Mr. Brehm's book, and how highly I esteem it."

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PART 17

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Respectfully,

SELMAR HESS, Publisher,

New York.

there is a rather large hump, which rises abruptly in front and tapers gradually towards the tail. The color of the Cachalot is a blackish-gray, somewhat tinged with green upon the upper portions of the body. Around the eyes and on the abdomen it is of a grayish-white.

This species is chiefly notable on account of the valuable substances which are obtained from its body, including oil and spermaceti. The oil is obtained from the blubber, which is not very thick in this animal, being only fourteen inches in depth on the breast and eleven inches on the other parts of the body, and is therefore not so abundant in proportion to the size of the animal as that which is extracted from the Greenland Whale. Its superior quality, however, compensates fully for its deficiency in quantity. The layer of blubber is by the whalers technically called the "blanket," probably in allusion to its office in preserving the animal heat.

SPERMACETI WHALE.—*Physeter macrocephalus.*

The spermaceti is almost peculiar to a few species of the genus Catodon, and is obtained as follows.

The enormous and curiously formed head is the great receptacle of the spermaceti, which lies in a liquid, oily state, in two great cavities that exist in the huge mass of tendinous substance of which the head is chiefly composed. On reference to the skull of the Cachalot, the reader will observe that it dips suddenly over the eyes, and then is greatly prolonged. This portion of the skull is termed Neptune's chair by the sailors, and it is in Neptune's chair that the spermaceti is placed. When the Whale is killed and towed to the ship's side, the head is cut off and affixed to tackles for the purpose of supporting it in a convenient position for the extraction of this valuable substance. A large hole is cut in the top of the head, and a number of sailors lower their buckets into the cavity and bale out the liquid matter.

When first exposed to the air it has a clear, oily appearance, but after it has been subjected to the action of the atmosphere for a few hours, the spermaceti begins to separate itself from the oil, and in a short time is sufficiently firm to be removed and put into a different vessel.

There is yet a considerable amount of oil mixed with the pure spermaceti, giving it a yellow, greasy aspect, which must be thoroughly removed before the spermaceti can assume its silky, crystalline appearance. The process of purifying it is rather a long and complicated one, consisting of various meltings and re-meltings, of squeezing through hair bags, and of treatment with a solution of potass. It is then sufficiently refined for commercial purposes, but if it should be required to be perfectly pure without any admixture of oil or extraneous substances, it is boiled in alcohol and is deposited in pearl-white laminated crystals, glistening with a silver sheen and separating easily into small scales.

The amount of spermaceti which is produced from the head of a single Whale is very large indeed. From a Cachalot that only measured sixty-four feet in length, and was therefore by no means a large one, twenty-four barrels of spermaceti and nearly one hundred barrels of oil were obtained.

Ambergris, that curious substance whose origin so long baffled the keenest inquirers, and which was formerly only found at rare intervals floating on the waves or cast upon the shore, is now often discovered within the intestines of the Cachalot, and is supposed to be a morbid secretion peculiar to the animal, and analagous to biliary calculi. Fifty pounds weight of this substance have been found in a single Whale, and on one occasion a single piece of ambergris of the same weight was discovered on the coast of the Bermudas by some sailors, who immediately deserted their ship and escaped to England with their valuable prize. The value of ambergris is rather variable, but it is always a costly article.

It is seldom, if ever, found in young and healthy Cachalots, so that a ship may make a very successful whaling voyage, and yet return home without finding a single ounce of ambergris in all the Whales killed. Ambergris is generally employed as a perfume, and is prepared for the use of the purchaser by being dissolved in alcohol.

It sometimes happens that a stray Cachalot blunders into the shallow waters of the Bermudas, and being unable to discover the passage through which it passed, is caught like a mouse in a trap, and falls a ready victim to the intrepid and almost amphibious natives.

SKULL OF SPERMACETI WHALE.

As soon as a Whale is discovered in this helpless situation, the populace is all astir and full of excitement at the welcome news. Boats are immediately launched, filled with men bearing guns, lances, and other destructive weapons, which would be of little use in the open sea, but are very effectual in the shoal waters of these strange islands. No sooner does the Whale feel the sharp lance in its body, than it dives with its ordinary velocity, forgetting that it is no longer in deep water, and strikes its head against the rocky bed of the sea with such unexpected force as to bring it to the surface half stunned. The hunters take advantage of its bewildered state to approach closely and to ply their deadly weapons with fatal effect. Some of these men are so cool and determined, that they will actually leap from their boats upon the Whale's back, and, setting their shoulders to the butt of the spear, urge the sharp blade by the weight of their bodies. The Whale soon yields up its life under such circumstances, and the huge carcase is brought to shore amid the shouts and congratulations of the spectators.

The fat and ivory of the slain animal are divided among the hunters who were actually engaged in the chase, but the flesh is distributed gratuitously to every one who chooses to apply for it. Every one who can own a barrow or a basket, bears it to the scene of slaughter, and is at liberty to take as much Whale's flesh as he chooses. The connoisseurs in Whale's flesh assert that there are three qualities of meat in every Whale, the best resembling mutton, the second quality imitating pork, and the third resembling beef. Captain Scott, an eye-witness of this animated scene, and to whom I am indebted for the information, avers that there really is some semblance of these various meats, and that the "pork," when salted and barrelled, might be readily taken for the flesh of the veritable hog.

The same gentleman tells me that the leaping powers of the Cachalot are not in the least exaggerated, for that he has seen one of these animals spring to such a height out of the water, that the horizon could be seen under it, although the spectators were standing on the deck of a man-of-war. The Cachalot was about three miles from the ship at the time when it made its spring.

The Spermaceti Whale, when it is in the open sea, lives chiefly on the "squids," or cuttle-fish, which swarm in the ocean, and when it approaches land, feeds on various fish. It seems, however, to dislike the propinquity of the shore, and is very seldom taken in "soundings." It is a gregarious animal, being seldom seen alone, but in large herds, technically called "schools," and consisting of several hundred in number. The "schools" are generally divided into two bands, the one consisting of young males and the other of females. Each band of females is under the command of several large males, who exercise the strictest discipline over their harems, and will not permit any intruder to join their society. From their office, these leaders are called the school-masters.

At distant intervals a large, overgrown Cachalot is seen roaming the ocean, apparently unconnected with any school. These solitary animals are, however, the "school-masters," which have laid down their authority for a short space of time, and are engaged in search of food. These animals generally fall easy victims to the harpooner, as they are very reckless in their conduct, and will permit a boat to approach them without much difficulty. Sometimes when struck they lie still and supine as if they did not feel the keen edge of the harpoon, and so afford time to the whalers to use their deadly lances at once instead of dragging them for miles over the waves.

Sometimes, however, a "large Whale" will become belligerent, and is then a most fearful antagonist, using its tail and its huge jaws with equal effect. One of these animals has been known to drive its lower jaw entirely through the plankings of a stout whaling boat, and another well-known individual destroyed nine boats in rapid succession. This formidable animal was at last killed, and in its carcase were found a whole armory of harpoons and spears belonging to different ships. Not only boats, but even ships have been sunk by the attacks of an infuriated "old bull" Cachalot.

An American ship, the *Essex*, was thus destroyed by the vengeful fury of a Cachalot which accidentally struck itself against the keel. The irritated animal, evidently thinking that the ship was a rival Whale, retired to a short distance and then charged full at the vessel, striking it on one side of the bows, and crushing beams and planks like straws. There were at the time only a few men on board, the remainder of the crew being in the boats engaged in chasing the Whales; and when the poor men returned to their ship, they found her fast sinking, and only reached her in time to secure a scanty stock of provision and water. Husbanding these precious supplies to the utmost, they made for the coast of Peru, but all perished excepting three, who were almost miraculously rescued as they lay senseless in their neglected boat, which was drifting at large in the ocean, unguided by human hands.

Like the Greenland Whale, the Cachalot is an affectionate animal, and though constitutionally timid to a degree, is yet possessed of sufficient moral courage to come to the rescue of its wounded friends. If the harpooner strikes one female of the "school," her companions will not attempt to make their escape, but will swim anxiously round their suffering companion, and remain in her vicinity until she is killed. Taking advantage of this trait of character, the whalers have often contrived, by sending a number of boats simultaneously, to secure almost every member of the "school." The young males, however, are far more selfish, and when one of them is struck, the others make off as fast as they can swim, leaving their wounded companion to shift for himself as he best can.

The natural timidity of the Cachalot is very remarkable, considering the gigantic size of the animal and the formidable array of teeth with which it is armed. Any strange object perceived by this creature throws it into a state of excited trepidation, during which time it performs several curious antics, and is said by the sailors to be "gallied." When uneasy, it has a strange habit of slowly sweeping its tail from side to side upon the surface of the water, as if feeling for the object that excited its terror.

When thoroughly frightened, and especially when roused to energetic action by the painful sting of the harpoon, the Cachalot darts along the surface of the water at an astonishing rate, its speed being often from ten to twelve miles per hour. As it proceeds in its rapid course, the alternate upward and downward strokes of the tail cause its head to sink and emerge alternately, producing that mode of swimming which is technically termed "head-out." As the lower part of the head is compressed into a kind of cut-water shape, there is less resistance offered to the water than if the creature swam entirely below the surface, as is its wont when undisturbed. It is conjectured that the enormous amount of oil and spermaceti which exists in the head of the Cachalot may be intended for the purpose of lightening the head, and enabling it to lie more easily upon the surface.

The "spoutings" of the Spermaceti Whale are very peculiar, and can be recognized at a distance of several miles. It generally lies still while spouting, but sometimes proceeds gently along the surface. Firstly the "hump" becomes perceptible as the animal rises, and at some forty or fifty feet distance the snout begins to emerge. From the extremity of the snout is ejected a continuous stream of water and vapor, which lasts for about three seconds, and is thrown forward at an angle of forty-five degrees.

The intervals of time between the "spoutings" are as regular as clockwork, and their number is always the same in the same individual. The snout sinks under water as each spouting is finished, and emerges for the next respiration. Sometimes a Cachalot is alarmed before "the spoutings are out," and dives below the surface. In such a case, the animal soon re-appears in another spot, and completes the number of the respirations. The interval of time between the spoutings is ten seconds in the "old bulls," and as the animal makes between sixty and seventy of these curious respirations, the time which is consumed in oxygenizing the blood is ten or eleven minutes.

Having completed this business, the creature then lowers its head into the water, flings its tail in the air, and disappears into the far depths of the ocean, where it remains about an hour and ten minutes. The number and force of these "spoutings," together with the time which is consumed by respiration, and the period of the stay beneath the surface of the water, are extremely varied, according to the age, sex, and size of the individual.

The Spermaceti Whale does not seem to choose any particular portion of the year for the production of its young, but is found at all seasons in charge of its offspring. Moreover, young Whales, or "cubs," are found of all sizes and ages, simultaneously roaming the seas, either in company with their parents or turned loose upon the world to shift for themselves. There is but a single cub at a birth. The milk of the animal is exceedingly rich and thick, as indeed is the case with the milk of all Whales.

This animal is very widely spread over the world, as it is found in almost every portion of the aqueous portions of the globe with the exception of the Polar Seas. Several of these creatures have been discovered off our own coasts, and a few have been stranded on the beach.

Sperm Whales are embraced under the family *Catodontidæ.* The head is enormously large, forming quite one-third of the bulk of the animal, and is curiously square and box-like in the snout. The latter contains the spermaceti, which is dipped out of the top of the head or snout when the upper surface is removed. The lower jaw is armed with numerous teeth, which fit into depressions in the upper. The pectoral limbs are small, and the dorsal fin is present. The blow-holes are situated nearer the extremity of the snout than those of the Right Whales.

The Sperm Whales are confined to tropical waters.

THE BLACK-FISH has been separated from the genus Catodon, and placed in the genus Physeter, together with one or two other Whales, because, although they possess the huge truncated head and heavily armed lower jaw of the Cachalots, the spout-holes are removed from the extremity of the snout and placed upon the middle of the top of the head. These spout-holes are separate, but are covered with a common flap. The pectoral fin is moderate in size, being about four feet long, and rather triangular in its form, and the dorsal fin is long and slightly sickle-shaped. The head is remarkably large, and probably exceeds in length the fourth of the entire bulk.

This species is of considerable dimensions when adult, as it is known to measure from fifty to sixty feet in length. In the lower jaw is a bountiful supply of teeth, white, powerful, and conical. These teeth are very variable in number, in different species, varying altogether from twenty-two to forty-four. An equal number of cartilaginous sockets are placed in the upper jaw, into which the conical teeth are received when the mouth is closed. The teeth that are placed in the middle of the jaw are larger and heavier than those of the front or base. Some of these teeth will exceed nine inches in length, and weigh more than eighteen ounces when perfectly dried.

The root of each tooth is hollow in the centre to the depth of several inches, and is so deeply buried in the jaw, that the projecting portion of the largest tooth rarely exceeds three inches. The teeth range from seven to nine inches in length. These teeth are very white and polished, are conical in their shape, tolerably sharp while the animal is young, but become blunt as the creature increases in years and dimensions.

The dimensions of one these animals have been very accurately given by Sibbald.

In total length it measured between fifty-two and fifty-three feet, its girth at the largest part of the body was rather more than thirty-two feet, and as it lay on the ground the height of its back was twelve feet. The lower jaw was ten feet in length, and was furnished with forty-two teeth, twenty-one on each side. Each tooth was slightly sickle-shaped, and curved towards the throat. From the tip of the snout to the eyes was a distance of twelve feet, and the upper part of the snout projected nearly five feet beyond the tip of the lower jaw. The eyes were remarkably small, about the size of those of the common haddock. As may be supposed from the popular name of this animal, the color of its skin is almost uniformly black. The throat is larger in proportion than that of other Whales. One of these animals was thrown ashore at Nice, in the month of November, 1736.

When the upper part of the head was opened, it was found to contain spermaceti, which lay in a mass of two feet in thickness in the usual locality. The blow-hole is graphically termed the "lum" or chimney.

In concluding this brief history of the Whales, it must be once more remarked, that, in spite of the earnest labors of many excellent observers, our knowledge of these wondrous creatures is as yet exceedingly rudimentary, and even the genera are not clearly ascertained. The native Greenlanders seem to possess a very large amount of information on this subject, and are extremely accurate in their knowledge of the various Whales and their habits. It has therefore been happily suggested, that succeeding voyagers should take advantage of this circumstance, and should use their best endeavors to extract from those illiterate, but very practical savages, the knowledge which they really possess.

The Dolphins do not possess the enormous head which characterizes the true whales, and have teeth in both jaws, although they are liable to fall out at an early age. The blow-holes are united together, so as to form a single lunate opening, which is set transversely on the crown of the head. When first born, the young Dolphins are remarkable for their very great proportional dimensions, being little less than one-fourth the size of the parent, and affording a wonderful contrast to the marsupials, whose young are of such minute proportions when first born.

From the circumstance that the lower jaws are only furnished with two teeth, the rare and curious animal which is represented in the accompanying illustration is sometimes scientifically termed the Diodon, or two-toothed animal. But as this generic title has already been appropriated to the urchin-fishes, the name has been more recently changed into Ziphius.

In the animals which belong to this genus, the spout-holes are placed upon the top of the head, the throat is furnished with two diverging furrows, and the teeth are only two in number, rather large in proportion to the skull, slightly curved and compressed, and are situated in the middle of the lower jaw. The pectoral fins are placed rather low, and their shape is oval, tapering towards their extremities. Sowerby's Ziphius is so called, because that well-known naturalist figured and described the animal. His description was founded upon a specimen that was cast ashore. The skull of this individual was preserved by Mr. Sowerby in his museum, and is so valuable a specimen that it has been industriously multiplied by means of plaster casts, which have been distributed to various scientific institutions.

The length of the creature was sixteen feet, and its girth at the largest part of the body was eleven feet. The head is small, narrow, and pointed, and the lower jaw is longer, blunter, and wider than the upper jaw, so that when the mouth is closed, the lower jaw receives the upper. In the upper jaw there are two depressions corresponding with the teeth, and permitting the perfect closing of the mouth. The color of the animal is black on the upper surface and gray below, and is remarkable for the pellucid and satin-like character of the skin, which reflects the rays of the sun to a considerable distance. The body is marked like watered silk. This effect is produced by a vast number of white streaks immediately below the skin, which are drawn irregularly over the whole body, and at a little distance appear as if they were made by means of some sharp instrument.

Nothing is known of the habits of this curious animal, which is unknown to science, except by means of the specimen above mentioned.

The Dolphins are represented in our Atlantic waters by the Common Dolphin. Historical and classical, this creature has in all ages claimed a good degree of interest and attention from the general reader, as well as the poet, the painter, and the *savant.* Its graceful form has long been the ideal of beauty in certain artistic groupings and designs. The characteristic prominence on its head, with its prolonged snout, is exaggerated somewhat to produce the conventional art-form. This is the true Dolphin of the poet and the painter, although the sailor may claim that the fish so called which exhibits most brilliant colors, made changeable while dying by certain aspects of the circulation of the blood, is also the true one. The latter has somewhat the same outline of head and shoulders, but the former, also, has the elongated flexible body, with the elegant forked tail, whose flukes add such grace to the drawings of ancient works. Though familiar to the reader by description and illustration, yet the Dolphin is seldom seen alive. An excellent opportunity was offered during the winter of 1878 in the New York Aquarium. A specimen measuring about seven feet in length was captured in the Long Island Sound, and was successfully exhibited alive during several months.

The Porpoise is the most familiar Cetacean to people living near the sea. It is especially a harbor species. Herds of them are often seen rolling, rolling, as they come to the surface to breathe. The name is curiously corrupted from the French, *porc-poisson*, hog-fish literally. This species reaches the length of seven feet, though usually it is about four or five.

THE word NARWHAL is derived from the Gothic, signifying "Beaked-whale," and is a very appropriate term for the SEA UNICORN, as the animal is popularly entitled. The head of the Narwhal is round, and convex in front, the lower jaw being without teeth, and not so wide as the upper jaw. From the upper jaw of the Narwhal springs the curious weapon which has gained for the animal a world-wide reputation.

In the upper jaw of the young or the female Narwhal are found two small, hollow tusks, imbedded in the bone, which, in the female, are generally undeveloped throughout the whole of the animal's existence, but in the male Narwhal are strangely modified. The right tusk remains in its infantine state, excepting that the hollow becomes filled with bony substance; but the left tusk rapidly increases in length, and is developed into a long, spiral, tapering rod of ivory, sometimes attaining to the length of eight or ten feet. The tusks are supposed to be formed by an excessive growth of the canine teeth, and not of the incisors, as might be supposed from the position which they occupy in the jaw.

The use of this singular tusk is very obscure, for if it were intended to serve some very important object, such as the procuring of food, it is evident that the females would need its aid as much as their companions of the opposite sex, for both sexes feed on the same food, and inhabit the same localities, at the same time. A very plausible conjecture has been offered, to the effect, that the "horn" is useful in the light of an auger, with which the animal is enabled to bore breathing-holes through the ice-fields, whenever it finds itself in want of air beneath those vast frozen plains. But this theory is equally liable to the objection, that the females want to breathe as much as the males, and would stand in equal need of so indispensable an apparatus.

That the "horn" is employed in some definite task, is evident from the fact, that its tip is always smooth and polished, however rough and encrusted the remainder of its length may be.

The male Narwhal may perhaps use the tusk as a weapon of war, wherewith to charge his adversaries, as a mediæval knight was wont to charge with shield on breast and lance in rest; and if that be the case, the weapon is truly a terrible one. This conjecture derives some force from the fact, that a herd of these aquatic spearmen have been seen engaged in sportive pastime, crossing their ivory lances, and seeming to fence with them, as the white weapons clashed against each other. The play of animals, not to mention mankind, is almost invariably founded on the spirit of combativeness, and generally consists in a sham fight; so that the Narwhal "horn" may probably be analogous to the tusks of boars and the horns of deer, and be given to the animal as an offensive weapon, wherewith he may wage war with those of his own species and sex who arouse his feelings of jealousy, or would interfere with his supremacy.

NARWHAL.—*Monodon monoceros.*

The food of the Narwhal consists chiefly of marine mollusks and of occasional fish, but is found to be generally composed of the same kind of squid, or cuttle-fish, which supplies the gigantic spermaceti whale with subsistence. As the remains of several flat fish have been discovered in the stomach of the Narwhal, it was supposed by some authors that the animal made use of its tusk as a fish-spear, transfixing them as they lay "sluddering" on the mud or sand, after their usual fashion, thus preventing their escape from the toothless mouth into which the wounded fish are then received. However this may be, the force of the tusk is terrific when urged with the impetus of the creature driving through the water at full speed, for the whole combined power of the weight and velocity of the animal is directed along the line of the tusk. A Narwhal has been known to encounter a ship, and to drive its tusk through the sheathing, and deeply into the timbers. The shock was probably fatal to the assailant, for the tooth was snapped by the sudden blow, remaining in the hole which it had made, and acting as a plug that effectually prevented the water from gaining admission into the vessel.

In some rare instances the right tusk has been developed instead of the left, and it is supposed that if the developed tooth should be broken, the right tusk becomes vivified, and supplies the place of the damaged weapon. One remarkable case is known where both tusks were almost equally developed, being rather more than ten inches in length; and another example is recorded of a Narwhal which possesses two long tusks, the one being seven feet five inches in length, and the other seven feet. These tusks diverge slightly from each other, as their tips are thirteen inches asunder, though there is only an interval of two inches between their bases. Both these specimens were females. Sometimes the female Narwhal possesses a spear like her mate, but this circumstance is probably the effect of age, which in so many creatures, such as the domestic fowl, gives to the aged female the characteristics and armature of the male.

As both these double-tusked Narwhals were females, it may be probable that they owed their unusual weapons to some peculiarity in their structure, which prevented them from becoming mothers, and forced the innate energies to expend themselves in the development of tusks instead of the formation of offspring. The tusks of male swine and other animals, the horns of male deer, the mane of male lions, and other similar structures, appear to be safety valves to the vital energies, which in the one sex are occupied in the continual formation of successive offspring, and in the other find an outlet in the development of tooth, horn, and hair, according to the character of the animal. In all probability, the health of the animal would greatly suffer if the calcareous and other particles which are deposited in the tusk were forced to remain in the system instead of being harmlessly removed from it and placed upon its exterior.

The ivory of the Narwhal's tusk is remarkably good in quality, being hard and solid, capable of receiving a high polish, and possessing the property of retaining its beautiful whiteness for a very long period, so that a large Narwhal horn is of no inconsiderable commercial value.

But in former days, an entire tusk of a Narwhal was considered to possess an inestimable value, for it was looked upon as the weapon of the veritable unicorn, reft from his forehead in despite of his supernatural strength and superhuman intellect. Setting aside the rarity of the thing, it derived a practical value from its presumed capability of disarming all poisons of their terrors, and of changing the deadliest draught into a wholesome beverage.

This antidotal potency was thought to be of vital service to the unicorn, whose residence was in the desert, among all kinds of loathsome beasts and poisonous reptiles, whose touch was death and whose look was contamination. The springs and pools at which such monsters quenched their thirst were saturated with poison by their contact, and would pour a fiery death through the veins of any animal that partook of the same water. But the unicorn, by dipping the tip of his horn into the pool, neutralized the venom, and rendered the deadly waters harmless. This admirable quality of the unicorn-horn was a great recommendation in days when the poisoned chalice crept too frequently upon the festive board; and a king could receive no worthier present than a goblet formed from such valuable material.

Even a few shavings of unicorn-horn were purchased at high prices, and the ready sale for such antidotes led to considerable adulteration—a fact which is piteously recorded by an old writer, who tells us that "some wicked persons do make a mingle-mangle thereof, as I saw among the Venetians, being as I here say compounded with lime and sope, or peradventure with earth or some stone (which things are apt to make bubbles arise), and afterwards sell it for the unicorn's horn." The same writer, however, supplies an easy test, whereby the genuine substance may be distinguished from the imposition. "For experience of the unicorn's horn to know whether it be right or not; put silk upon a burning coal, and upon the silk the aforesaid horn, and if so be that it be true, the silk will not be a whit consumed."

The native Greenlanders hold the Narwhal in high estimation; for, independently of its value, it is welcomed on each succeeding year as the harbinger of the Greenland Whale.

The Narwhal is, however, of the greatest service to the Greenlanders, for its long ivory tusk is admirably adapted for the manufacture of various household implements and of spear-heads, so that it is the sad fate of many a Narwhal to perish by means of the tooth that has been extracted from its near kinsman. It is easily killed, as it possesses no very great power of diving, and is soon tired out by means of the inflated buoys which are attached to the harpoon, and offer so great a resistance to the water. It seldom descends above two hundred fathoms below the surface, and when it again rises is so fatigued that it is readily killed by a sharp spear.

The oil which is extracted from the blubber is very delicate, but is not present in very great amount, as the coating of fatty substance is seldom more than three inches in depth. About half a ton of oil is obtained from a large specimen. The flesh is much prized by the natives, and is not only eaten in its fresh state, but is carefully dried and prepared over the fire.

The color of this animal is almost entirely black upon the upper surface of the body, but is slightly varied by streaks and patches of a deeper tint. The sides fade into grayish-white, diversified with sundry gray marks, and the under portions of the body are white. The tints of the Narwhal are rather variable even in the same individual, which assumes different hues at different stages of its existence. There is no fin upon the back of the Narwhal, but its place is indicated by a fold or ridge of skin which runs down the centre of the back, and in old specimens appears to have been subjected to hard usage. The pectoral fins are very small in proportion to the size of the animal, and appear to be of little service to the owner except for the purpose of preserving the balance of the body. In the upper jaw there are two other teeth beside the tusks, which are concealed in the gum, and are supposed to be false molars.

The Narwhal is a gregarious animal, being seldom seen alone, and generally associating in little companies of fifteen or twenty in number. It seems to be gifted with a considerable amount of curiosity, as Sowerby mentions that several of these animals pursued the ship from some distance, diving below the strange monster and playing near the rudder. It is seldom found in southern latitudes, but is seen in great numbers between the seventeenth and eighteenth degree of north latitude. The length of an adult Narwhal is about thirteen feet.

The Narwhal is unique as a species and common to both hemispheres. Its wonderful tusk—one only being developed usually, though instances occur where both are full grown—has given it the appellation of Sea Unicorn. It is not easy to comprehend the uses of such a weapon. Its great length, though formidable as a means of offense, would seem an obstruction in feeding. The ivory of the tusk is regarded of great value.

The Beluga, which is sometimes called the White Whale on account of the color of its skin, is an inhabitant of the higher latitudes, being found in great numbers in Hudson's Bay and Davis' Straits, and is also known to frequent the northern coasts of Asia and America, being especially fond of the mouths of large rivers.

The head of the Beluga is short and rounded, the forehead being convex, and the lower jaw not so wide as the upper. Both jaws of this animal are well supplied with teeth, some of which have a tendency to fall out as the animal increases in years, and are generally wanting in the jaws of those specimens which are captured. The dorsal fin is absent, and the pectorals are tolerably large, thick, powerful, and rounded. The thick and powerful tail is bent under the body while the animal is swimming, and is used with such singular strength that the creature shoots forward with arrowy speed, whenever it is alarmed or excited.

The color of this animal is generally a cream-white, but in some specimens the cream tint is dashed with red, and becomes a pale orange. When young, the Beluga is marked with brown spots, the general hue of the body being a slaty gray. The average length of an adult male is about eighteen or twenty feet. The eye of this animal is hardly larger than that of man, and the iris is blue. The food of the Beluga consists chiefly of marine fish, such as cod, haddocks, and flounders, which are easily caught by these active and voracious animals.

On account of their speed and agility, the whalers seldom attempt their capture, although their boldness is so great as to induce them to follow the boats in considerable numbers, and to play all kinds of antics within easy reach of a harpoon. As, however, they are so swift and agile as to elude the barbed steel, or to shake it from its hold if it should happen to strike them, the harpooner seldom runs the risk of losing time and patience in the chase of such a creature. Moreover, even were the animal fairly struck and secured, the blubber is not of sufficient value to repay the crew for their expenditure of time, labor, and personal risk.

BELUGA.—*Beluga leucas.*

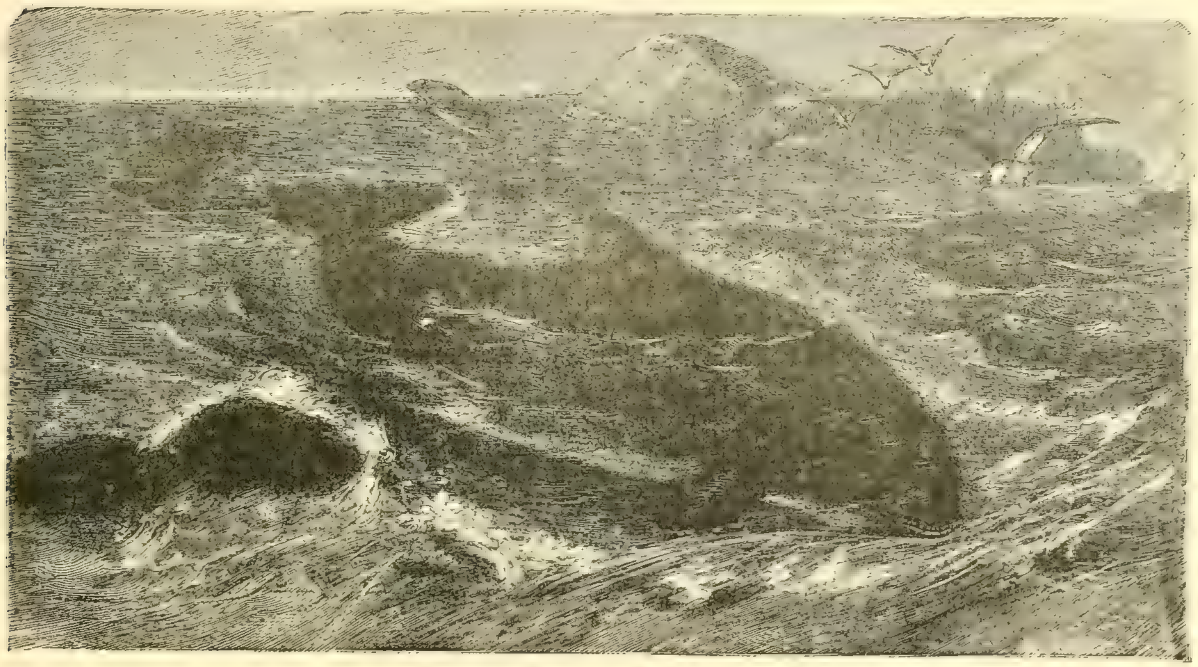
The oil that is furnished by the Beluga is of very good quality, although small in quantity, and is sufficiently valuable to lead to the establishment of regular Beluga hunts in the great rivers of Northern America, which they ascend for some distance in search of prey.

These hunts are often very successful, and furnish a large supply of oil and skin. As soon as a Beluga is seen in the river or inlet, its retreat is cut off by strong nets laid from bank to bank. A number of boats then start in chase of the animal, while others are stationed along the line of nets, and manned with well-armed crews. When alarmed by the boats, the Beluga makes for the sea, but is interrupted by the nets, which bar its further progress seawards, and soon falls a victim to the bullets, spears, and other missiles which are rained upon it by its assailants. Sometimes the harpoon and rope are employed in this chase, and small specimens are occasionally taken by means of hooks baited with fish. Those Belugas which are taken in the St. Lawrence are seldom more than fifteen feet in length.

The skin of the Beluga is subjected to the process of tanning, and can be made into a peculiarly strong though soft leather, which is said to be able to resist an ordinary musket-ball. The flesh is held in some estimation, and is said to bear some resemblance to beef. Its oily flavor, however, which cannot easily be destroyed, would render it unpalatable to our palates. When prepared with vinegar and salt, it is thought to be equal to the best pork. The fins and tail are considered as the best portions.

It is a migrating animal, visiting the western coasts of Greenland at regular intervals, reaching that locality about the end of November. It swims in large herds, and is of exceeding value to the natives, who not only eat its flesh, and burn and drink its oil, but employ the sinews for thread, which may be made of any degree of fineness by splitting the tendons, and use the delicate internal membranes for windows to their huts. The coming of the Beluga is anxiously expected by the Greenlanders, as their provisions generally run short about the end of November, and are replenished by the flesh of their welcome visitor.

The Beluga, or White Whale, is closely allied to the above. This cetacean, in an adult, is about twelve feet in length. The color is a uniform creamy white. Its *habitat* is the region of the St. Lawrence River, where shoals of them even push into the fresh water. It is captured for its oil. Specimens ten feet in length have been transported to New York, where they have been kept in the great tanks of the Aquarium. Indeed, one was successfully taken to England, and lived long enough to give some opportunity to witness a living whale in confinement. This specimen was quite amenable to domestication—feeding from its keeper's hands, etc.



PORPOISE.—*Phocæna communis.*

Most familiar of all the Dolphin fraternity is the well-known **Porpoise**, or **Sea Hog**, an animal which may be seen on any of our coasts, tumbling about on the waves, and executing various gambols in the exuberance of its sportive feelings.

Before steamboats came into general use, the Porpoises were constant attendants on the packet and passenger boats, sometimes pursuing the vessels from sheer curiosity, and at other times following in their wake in hopes of picking up the garbage that might be thrown overboard. In the present day, however, the Porpoises are so frightened at the paddles and screws, that they remain at a respectful distance from the boats, content themselves with keeping pace with the vessels for a course of some miles, and then drop astern to rejoin their companions.

The Porpoise is a very gregarious animal, herding together in large shoals, and sometimes swimming in "Indian file" as they shoot over the surface of the sea; just showing their black and glossy backs above the water, and keeping such excellent line that they seem to be animated by one spirit and one will.

As might be presumed from the formidable array of sharp teeth with which the jaws are studded, and which are so arranged that the upper and lower sets interlock when the animal closes its mouth, the food of the Porpoise consists entirely of animal substances, and almost wholly of fish, which it consumes in large quantities, much to the disgust of human fishermen. Herrings, pilchards, sprats, and other salable fish, are in great favor with the Porpoise, which pursues its finny prey to the very shores, and, driving among the vast shoals in which these fish congregate, destroys enormous quantities of them. The fish are conscious of the presence of their destroyer, and flee before it in terror, often flinging themselves into the certain death of nets or shallow water in their hope to escape from the devouring jaws of the Porpoise. Even salmon and such large fish fall frequent victims to their pursuer, which twists, turns, and leaps with such continuous agility that it is more than a match for its swift and nimble prey. Not even the marvellous leaping powers of the salmon are sufficient to save them from the voracious Porpoise, which is not to be baffled by any such impotent devices.

The Porpoise seems to keep closely to the coasts, and is seldom seen in mid-ocean. It appears to be a migratory animal, as the season of its disappearance from one locality generally coincides with its arrival on some other coast. It is very widely spread, appearing to inhabit with equal security the warm waters of the Mediterranean, the cool seas of our own coasts, or the icy regions of the high latitudes.

Many of these animals have been found in our rivers, which they have evidently ascended with the idea of varying their diet by a few meals on fresh-water fish. The combined influences of steamboats and sewerage afford a most effectual barrier to the presence in our rivers of any animal which could in any way remain in the sweet waters of the open sea. It is, nevertheless, seldom that a year passes away without several notices in local newspapers of Porpoises which have been seen or captured in fresh water.

The length of a full-grown Porpoise is extremely variable, the average being from six to eight feet. In this animal the very great size of the new-born young is very remarkable. A mother-Porpoise and her new-born offspring were taken in the Frith of Forth in 1838. The length of the mother was four feet eight inches, and her girth two feet ten inches; while the length of her offspring was two feet ten inches, and its girth sixteen inches. On the nose of the young Porpoise there are always two thick bristles, which fall out as the creature advances in age, and cause two depressions, which have erroneously been taken for nostrils. The color of the Porpoise is a blue-black on the upper surface of the body, and a bright silvery white below; so that when the animal executes one of its favorite gyrations the contrasting tints produce a strange effect as they rapidly succeed each other. The iris of the eye is yellowish.

The word Porpoise is corrupted from the French term "Porc-poisson," *i.e.*, Hog-fish, and bears the same signification as its German name, "Meerschwein."

When the skin of a Porpoise is removed from the body, a layer of white fat is seen lying upon the flesh, about an inch in depth. This fatty layer melts into oil when subjected to the action of heat, and is very fine and delicate in its quality. In common with the oil of other of the Porpoises, it contains a peculiar volatile acid, which can be separated from the fat by chemical agency, and is termed phocenine. The odor of this substance is very powerful, and its taste is acrid and aromatic. It does not congeal even when its temperature is lowered to fourteen degrees above zero, and its boiling-point is higher than that of water.

The skin of the Porpoise is well suited for tanning, and can be manufactured into valuable leather. As it is naturally too thick and heavy for this process, it is planed down until it becomes partially transparent, and is then employed for covering carriages, as well as for some articles of apparel.

In former times the flesh of the Porpoise was valued very highly, and was looked upon as a regal dish, being cooked with bread-crumbs and vinegar. Before it is dressed it is very unpleasing to the eye, being dark-colored, coarse-looking, and evidently too full of blood; and its flavor when cooked is said to be coarse and unpleasant. As the Porpoise was conventionally considered as a fish, in common with the otter, seal, and certain sea-fowl, by the ecclesiastical rulers of the land, its flesh was a great boon to those who cared not for a fish diet on the multiplied meagre days which studded the calendar, and at the same time were too reverential towards their ecclesiastical superiors to eat that which was openly considered as butchers' meat.

On examining the jaws of a Porpoise, we find them to be closely set with rather long, sharp, compressed, and formidable teeth, variable in number, but always multitudinous. There are seldom less than eighty teeth in a Porpoise's mouth, and in the jaws of the female specimen which has already been mentioned there were no less than one hundred and two teeth, twenty-six on each side of the upper jaw, and twenty-five on each side of the lower. In these animals there is no perceptible distinction between the teeth; incisors, canines, and molars being all alike.

The head of the **Grampus** is more rounded than that of the porpoise, and its forehead is more convex. There are several species of Delphinidæ which are called by the name of Grampus, the best known of which is the ordinary or common Grampus.

It is a decidedly large animal, an adult specimen measuring from twenty to thirty feet in length, and from ten to twelve in girth. The teeth are not nearly so numerous as in the porpoise, being only forty-four in total number, eleven at each side of each jaw. In shape they are somewhat conical, strongly made, and slightly curved. The color of the Grampus is black on the upper part of the body, suddenly changing into white on the abdomen and part of the sides. There is generally a white patch of considerable size immediately above and rather behind the eyelid.

GRAMPUS.—*Orca gladiator.*

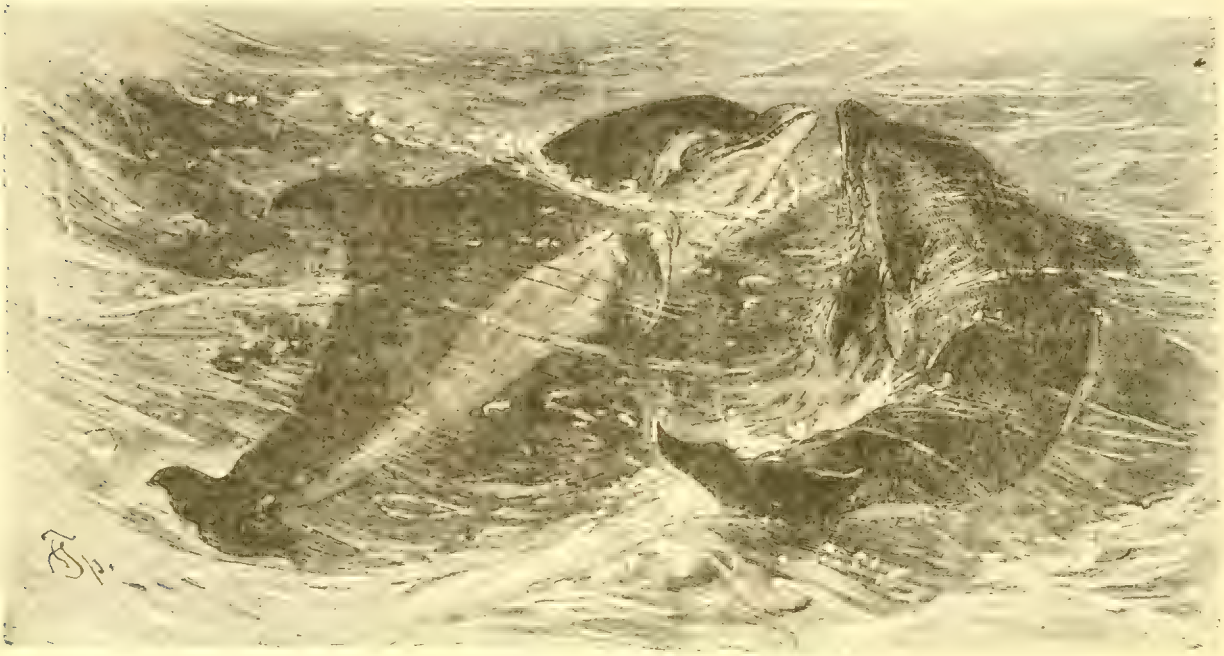
The name Grampus appears to be a corruption of the French word "Grand-poisson," just as porpoise is a transmuted form of "porc-poisson."

Although it sometimes wanders into more southern regions, its favored home is in the northern seas that wash the coasts of Greenland and Spitzbergen, where it congregates in small herds. It is a very wolf in its constant hunger, and commits great havoc among the larger fish, such as the cod, the skate, and the halibut, caring little for the smaller fry. At times it is said to make systematic attacks on seals, by startling them from their slumber as they lie sunning themselves on the rocks or ice, and seizing them as the half-sleeping animals plunge instinctively into the sea. Even the smaller porpoises and dolphins fall victims to the insatiable appetite of the Grampus, as has been proved by the discovery of their remains in the dissected stomach of one of these animals.

It is said that the Grampuses are fond of amusing themselves by mobbing the Greenland whale, just as the little birds mob owls when they venture forth in the daytime, and that they persecute it by leaping out of the water and striking it sharply with their tails as they descend. In consequence it has been called by the name of Thresher, or Killer. The sword-fish is reported to join the Thresher in this amusement, and to prevent the whale from diving by attacking it from below. Whatever credence may be given to the latter part of the story, the former is certainly true, and is corroborated by Captain Scott, who tells me that he has often seen the Thresher engaged in this strange amusement, springing high out of the water, and delivering the most terrific blows with its tail on the object of its pursuit. For the co-operation of the sword-fish he does not vouch, but has remarked that the whale does not seek refuge in the ocean depths when thus persecuted, but makes short and hurried attempts to dive, seeming to be prevented from making its escape by some allied force beneath.

APART from the marvellous tales which were once rife concerning the beauty and accomplishments of the DOLPHIN, the animal is well worthy of notice, and needs no aid of fictitious narrative to enhance its value in the eyes of the naturalist or the observer.

The Dolphin is remarkable for the enormous number of teeth which stud its mouth, no less than forty-seven being found on each side of both jaws, the full complement being one hundred and ninety. In the head of one specimen were found fifty teeth on each side of each jaw, making a complement of two hundred in all. Between the teeth there is a space equal to the width of a single tooth, so that when the animal closes its mouth the teeth of both jaws interlock perfectly. All the teeth are sharply pointed and flattened, and slightly curved backward, so that the entire apparatus is wonderfully adapted for the retention of the slippery marine creatures on which the Dolphin feeds. Fish of various kinds form the usual diet of the Dolphin, which especially delights in the flat fishes of our coasts, and often prowls about the shoals of herrings and pilchards that periodically reach our shores.


DOLPHIN.—*Delphinus delphis.*

The Dolphin is not a very large animal, measuring, when full grown, from six to ten feet in length, seven feet being the usual average. Its color is black upon the back, and silvery-white on the abdomen, while the flanks are grayish-white. There is a peculiar satin-like sheen upon the skin when the animal is submerged beneath the water or freshly removed from the sea, but which rapidly disappears as the skin becomes dry. The beautiful colors which have been said to play about the body of a dying Dolphin are not entirely mythical, but belong rightly to one of the fishes, the coryphene, or dorado, which is popularly called the Dolphin by sailors.

The eyes of the Dolphin are small, and are supplied with eyelids; the pupil of the eye is heart-shaped. The ears have but a very minute external aperture, barely admitting an ordinary pin, so that its sense of hearing appears to be very limited.

In former days the flesh of the Dolphin was thought to be a very great luxury, so great, indeed, that a Dolphin was considered as a noble present to be made to the Duke of Norfolk by Dr. Caius, the well-known founder of the college bearing his name. As the Dolphin, in common with the porpoise and all the cetaceans, was considered as belonging to the fishes, its flesh was a permitted diet upon maigre days, when all flesh meat was rigidly forbidden by ecclesiastic prohibition, and was served to table with a sauce composed of bread-crumbs, vinegar, and sugar. Now-a-days, however, the flesh of the Dolphin has fallen entirely into disrepute as an article of diet, and is not to be restored to its former station even by the force of prelatical discipline.

It is a lively and playful animal, and being remarkably active in its native element, is fond of gambolling among the waves, and engaging in various sports with its companions. Being of a very gregarious nature, it is seldom seen alone, but prefers to associate in little flocks or herds, and is in the habit of accompanying ships for considerable distances, hovering about the vessel and executing various strange manœuvres. Sometimes it falls a victim to its curiosity, and when paying too close a visit to the vessel is struck with the "grains," or barbed trident, which is kept on board in readiness for such an occasion, and is hauled struggling on deck, where it is soon deprived of life.

The formation of the Dolphin's brain is of such a nature that it indicates great intelligence on the part of its possessor, and goes far towards confirming some of the current reports on this subject. It is said that Dolphins have been tamed and taught to feed from the hand of their instructor, beside performing sundry feats at his bidding. That the seals are eminently capable of instruction is a well-known fact, and it is probable that the Dolphins may not be less endowed with intellectual powers.

From the peculiar shape of the snout and jaws, which are rather flattened and considerably elongated, the animal has derived its French titles of "Bec d'Oie" and "Oie de Mer," *i.e.* Goose-beak, or Sea-goose. The forehead is rather rounded, and descends suddenly towards the base of the "beak." The "beak" itself is about six inches in length in a moderately sized specimen, and is separated from the forehead by a small but distinct ridge. The Dolphin only produces a single young one at a time, and nurses her offspring with exceeding tenderness and assiduity.

The common Dolphin is found in the European seas, and in the Atlantic and the Mediterranean, and may possibly have a still wider range. There are Dolphins to be found near the coasts of Africa and America, but whether they belong to the same species as the common Dolphin is at present a mooted point.

In the Bottle-nosed Dolphin there is not such an extraordinary array of teeth as in the preceding animal, their maximum number being one hundred, and their average about eighty-five. The average length of this animal is between seven and eight feet, although specimens have been taken which measured between ten and eleven feet in length.

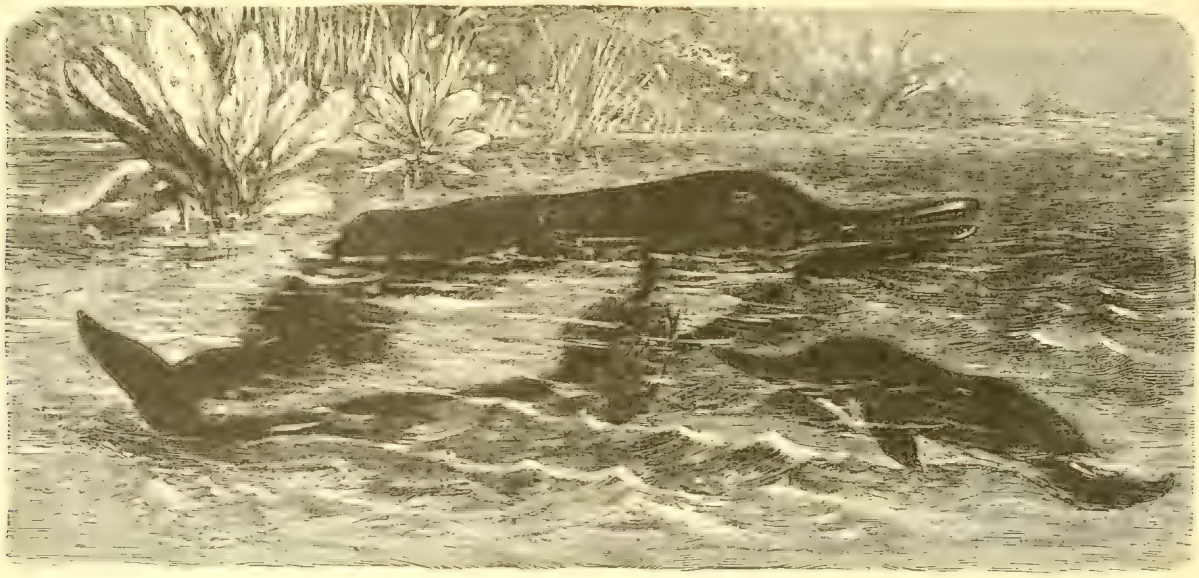
The color of the Bottle-nosed Dolphin is rather different from that of the common Dolphin. Its back is not of the same jetty hue, but is deeply tinged with purple, its flanks are dusky, and the under portions are grayish-white, and do not glisten with the pure silvery-white of the ordinary Dolphin of our coasts.

Although it is a rare animal, it has more than once been captured. Two Bottle-nosed Dolphins, a mother and her young one, were caught upon the sea-coast, where they had been seen for several days haunting the neighborhood. The first of these specimens was captured when it had ascended the river about five miles, and was so powerful and active that it did not resign its life until it had fought for a space of four hours against eight men armed with spears and guns, and assisted by dogs. While struggling with its foes it bellowed loudly, making a sound like that of an enraged bull. This individual was more than eleven feet in length.

In many instances the teeth of the Bottle-nosed Dolphin are extremely blunt, a circumstance which was once thought to be peculiar to the species. Mr. Bell, however, proves to the contrary by the fact of possessing two skulls of Bottle-nosed Dolphins, in which the teeth are of the usual length, and as sharp as in the ordinary Dolphin. When the teeth are thus worn down, the creature is unable to interlock them rightly, as the narrow portion of the teeth has been ground down, and the interstices are too narrow to receive the wide stumps. The name of Blunt-toothed Dolphin has been given to this animal on account of the supposed normal shape of the teeth. The lower jaw of this species projects rather beyond the upper.

BOTTLE-NOSED DOLPHIN.—*Delphinus tursio.*

There is a curious animal belonging to this family, which inhabits the Ganges, and is known by the name of the Soosoo.



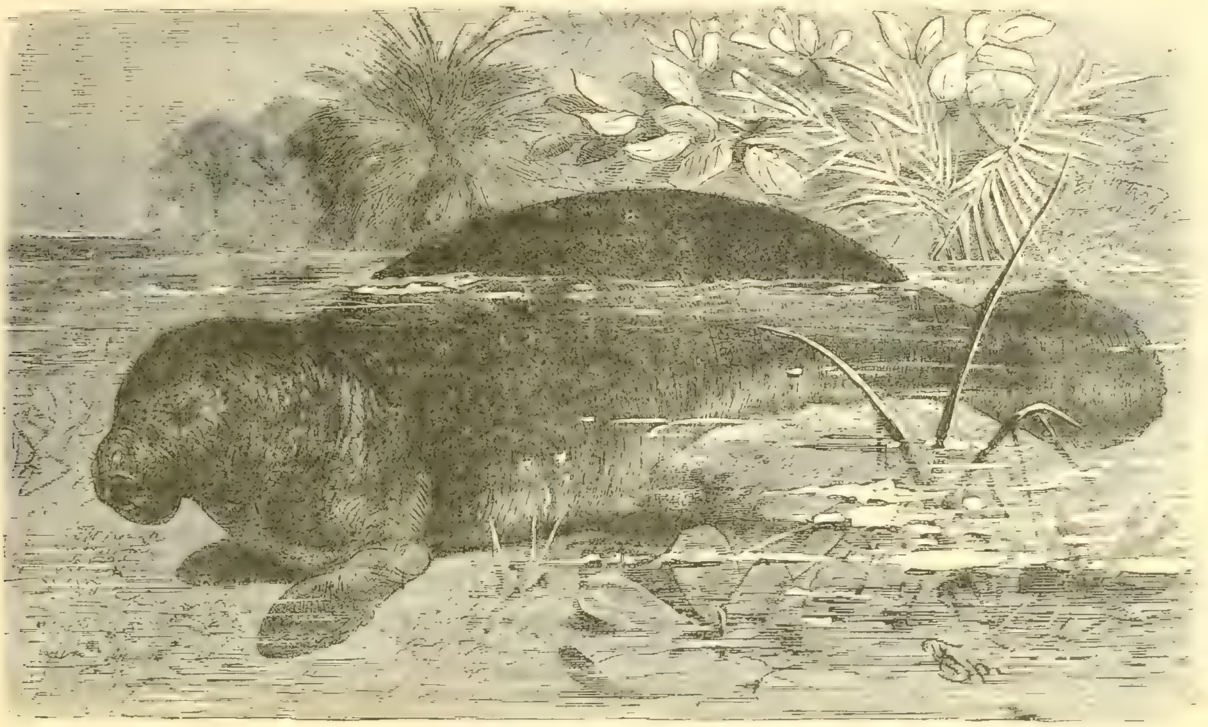
SOOSOO.—*Platanista gangetica.*

It is remarkable for the curious shape of its "beak," which is long, slender, compressed at the sides, and is larger at the extremity than in the middle. The number of its teeth is about one hundred and twenty. It is a swift and powerful, but at the same time a sluggish animal, appearing to partake largely of the curious mixture of sloth and energy which is found in the huge lizards that frequent the same river, and never caring to exert itself except in chase of its prey. Its color is grayish-black upon the back, and white on the abdomen. The eye is wonderfully small, being only one-eighth of an inch in diameter in a Soosoo which measures four or five feet in length. There is no dorsal fin, its place being indicated by a small projection.

SIRENIA.

MANATEES AND DUGONGS.

The small but singular group of animals that are classed together under the title of the Sirenia, are so formed that anatomists have had much difficulty in deciding upon their proper position in the animal kingdom. Many parts of their structure exhibit so strong an affinity to the pachydermata, or thick-skinned mammalia, that they have been placed next to the elephants by some zoologists, while their fish-like form and aquatic habits have induced other writers to place them in the position which they now occupy in the British Museum. They feed chiefly on vegetable substances, and find the greater part of their subsistence in the thick herbage that edges the waters where they reside. Their nostrils are placed at the extremity of the muzzle, as is the case with most mammalia, and they are never employed as blow-holes, after the manner of the cetaceans.



MANATEE.—*Manatus americanus.*

The Manatee, or Lamantine, is a very strange-looking creature, appearing like a curious mixture of several dissimilar animals, the seal and hippopotamus being predominant.

There are several species of Manatee, two of which are found in America and one in Africa, but always on those shores which are washed by the waters of the Atlantic Ocean. The common Manatee is generally about nine or ten feet in length, and is remarkable for the thick fleshy disc which terminates the muzzle, and in which the nostrils are placed. It is found in some plenty at the mouths of sundry large rivers, such as the Orinoko or the Amazon, and feeds upon the algæ and other herbage which grows so plentifully in those regions. By some writers the animal is said to leave the water entirely, and to search for its food upon the land, but this assertion is now ascertained to be incorrect. It is, however, in the habit of crawling partly out of the water, and has a strange custom of elevating its head and shoulders above the surface in such a manner that it bears some resemblance to a human being.

The flesh of this animal is said to be well flavored, and as the Manatee is ecclesiastically reckoned as a fish, together with the whales, seals, and other water-loving creatures, it is permitted as a lawful article of diet on fasting days. When properly salted and preserved by drying in the sun, the flesh of this animal will remain sweet for a whole year. The skin of the Manatee is in great request for the formation of sundry leathern articles in which great strength is required, and the oil which is extracted from its fat is of excellent quality, and is free from the unpleasant rancid odor which characterizes so many animal oils.

So valuable an animal is subject to great persecution on the part of the natives, who display great activity, skill, and courage in the pursuit of their amphibious quarry. The skin of the Manatee is so thick and strong that the wretched steel of which their weapons are composed is quite unable to penetrate the tough hide. Nothing is so effectual a weapon for this service as a common three-cornered file, which is fastened to a spear-shaft, and pierces through the tough hide with the greatest ease. The skin of the Manatee is so thick that it can be cut into strips like the too-celebrated "cow-hide" of America, which is manufactured from the skin of the hippopotamus. Before being dressed, the hide of the Manatee is thinly covered with rather stiff bristles.

The Manatee (*Manatus americanus*) is quite limited in its *habitat*. In North America, Tampa Bay, in Florida, is one of the few localities inhabited by it. Formerly it was very abundant in the creeks and inlets of Florida. The Seminole Indians hunted it largely ; and it is probable that it will soon become extinct. One characteristic of this creature is its herbivorous nature ; its teeth being of the nature of grinders. The front teeth are not developed, but instead there are cartilaginous pads, which are something like those of the upper jaw of ruminants, serving the same purpose, to nip the tender plants of the shallow water.

A specimen was kept at the Central Park Menagerie several months, where ample opportunity was offered to study the habits of this rare and strange animal. Perhaps no other creature is so completely uncouth and unattractive. Its general aspect is much like that of a gigantic mole.

The extinct form Rytina has lately been made somewhat more familiar to science by means of a large number of bones sent from Behring's Strait to the Smithsonian Institution. The collection was sufficiently diversified to allow of several perfect skeletons being put together.

THE DUGONG may easily be distinguished from the manatee by the formation of the tail, which in the latter animal is rounded, but in the former is forked. These animals are found on the eastern coast of Africa and on the shores of the Indian Ocean.

In Ceylon the Dugong is exceedingly plentiful, and it also inhabits the northern coasts of Australia, where it is assiduously chased by the natives. The name of Sirenia, which is given to this group of animals, is chiefly owing to the peculiar form and habits of the Dugong, which has a curious custom of swimming with its head and neck above the surface of the water, so that it bears some grotesque resemblance to the human form, and might have given rise to the poetical tales of mermaids and sirens which have prevailed in the literature of all ages and countries. When the female Dugong is nursing her child, she carries it in one arm, and takes care to keep the head of her offspring, as well as her own, above the surface of the water, and thus presents a strangely human aspect. If alarmed, she immediately dives below the waves, and flinging her fish-like tail into the air, corresponds in no inadequate degree with the popular notions of mermaid form.

The usual haunts of the Dugong are at the mouth of rivers or similar spots, where the subaqueous algæ grow in greatest profusion, and it never seems to be found where water is more than three or four fathoms in depth. It is not so good a diver as the seals, not being furnished with the peculiar blood-reservoirs which enable those animals to survive beneath the water for so great a length of time ; and it is therefore unable to seek its food except in shallow waters. Whole herds of these animals may be seen sporting near the shores, diving at intervals to procure food, and rising again in order to breathe. They are most affectionate creatures, and if one of a pair be captured, the other falls an easy prey to the pursuers, as it refuses to leave the fatal spot, and will rather suffer itself to be killed than forsake even the dead body of its late partner.

There are several species of Dugong, which are all very similar in habits, although they vary in size. One species has been known to attain to the length of twenty-six feet. The skull of these animals is very singularly formed, the upper jaw being bent downward over the lower jaw, and terminated by two large incisor teeth. It is supposed that the object of this structure is to assist the animal in gathering together and dragging up by the roots the algæ and other subaqueous vegetation on which it feeds.

The skin of the Dugong is capable of being manufactured into various useful articles, and the flesh is in some repute, being said to bear close resemblance to veal.

DUGONG—*Halicore dugong.*

A THIRD genus of these herbivorous cetaceans is the RYTINA, which is supposed to be now extinct, the last known specimen having been killed in 1768, only twenty-seven years after the creatures were discovered.

The Rytina possessed no true teeth, and masticated its food by means of two bony plates, one of which was attached to the front of the palate, and the other to the lower jaw. It was a large animal, measuring about twenty-five feet in length, and nearly twenty feet in circumference. The Rytina was discovered in the year 1741 on an island in Behring's Strait; and as the animals were large, heavy, and unarmed, they were most valuable in affording food to the unfortunate sailors who were shipwrecked upon that island, and were forced to abide there for the space of ten months. When the islands were visited by ships in search of sea-otters, which abounded in that locality, the crews found the Rytinas to be so valuable and so easy a prey that the entire race was extirpated in a few years.

The only account of the Rytina is that which was furnished by Steller, one of the shipwrecked party, who, undaunted by the terrible privations which he was forced to undergo, wrote an admirable description of the animal, which was afterwards published in St. Petersburg.

RODENTIA;

OR GNAWING ANIMALS.

THE RODENTS, or gnawing animals, derive their name from the peculiar structure of their teeth, which are specially fitted for gnawing their way through hard substances. The jaws of the Rodents are heavily made, and very large in proportion to the head, their size being not only needful for the support of the gnawing teeth, but for their continual development. There are no canines, but a wide gap exists between the incisors and the molars, which are nearly flat on their surfaces, and are well suited for grinding the soft substances on which these animals feed.

The structure of the chisel-edged incisor teeth is very wonderful, and may be easily understood by inspecting the teeth of a rat, mouse, hare, or rabbit.

As their teeth are continually worn out by the severe friction which they undergo, there must needs be some provision for renewing their substance, or the creature would soon die of starvation. In order to obviate this calamity, the base of the incisor teeth pass deeply into the jaw-bone, where they are continually nourished by a kind of pulpy substance from which the tooth is formed, and which adds fresh material in proportion to the daily waste. Sometimes it happens that one of the incisor teeth is broken or injured by some accident, so that it offers no resistance to its corresponding tooth in the opposite jaw. The result of such an accident is very sad to the sufferer, and is not unfrequently fatal in its termination. For the unopposed tooth, being continually increased by fresh substance from behind, is gradually pushed forward until it attains an enormous length, having sometimes been known to form a complete circle. Examples of these malformed teeth are of tolerably frequent occurrence, and specimens may be seen in almost every museum of comparative anatomy.

Something more is needed for the well-being of the animal than the mere growth of its teeth; for unless their chisel-like edges were continually kept sharp, they would be of little use for cutting their way through the hard substances which the Rodents are in the habit of gnawing. This result is attained as follows:

The enamel which covers the front face of the incisor teeth is much harder than that which is laid upon the remaining surfaces, while the dentine which makes up the solid mass of each tooth is also harder in front than behind. It is evident that when these teeth are employed in their usual task, the softer enamel and dentine are worn away very much more rapidly than the remainder of the teeth, so that the peculiar chisel edge of the teeth is continually preserved. Following—perhaps unconsciously—the structure of these teeth, our cutlers have long been accustomed to make their axes on the same principle, a thin plate of steel being inclosed within two thick plates of iron, so that when the axe is used upon timber, the iron is continually worn away, leaving the plate of steel to project, and form a sharp cutting edge.

In many species of Rodents, the front faces of the incisor teeth are tinted with a light orange red, or a reddish-brown, by means of a very thin layer of colored enamel. In order to enable these teeth to perform their office rightly, the lower jaw is jointed so as to slide backwards and forwards.

The Rodent animals are widely spread over the entire globe, and are very numerous, comprising nearly one-third of the mammalia.

The magnificent work on "The North American Rodents," by Dr. Coues and J. A. Allen, published in Hayden's Geological Reports, 1877, furnishes a vast amount of valuable matter on the subject.

Members of this order belong to all portions of the globe, and are particularly abundant in America, where there are said to be as many as are known to all parts of the world. The order contains more species than any other class of mammals, between eight and nine hundred being known, and they are very evenly distributed. In South America there are more than in the northern half of the New World; but the great number of species included in the one genus, Hesperomys, cause this preponderance.

There are no indigenous Rodents common to both Europe and America, excepting the beaver, which is regarded by some as the same in both countries. The Musk Rat and a species of Spermophilus are said to occur in Kamtschatka; in this event these would hold as exceptions. There are no South American species in North America, but a close relationship exists between the genera. Wallace gives the following, as regard the family of Rodents, and number of genera and species. *Muridæ*, the Mouse family, has thirty-seven genera, and three hundred and thirty species. The true Mouse (the species common to our houses), he records as not found indigenous in North nor South America, nor the three insular groups belonging to the Australian region, but it is indigenous in the remaining portions of the globe very widely. Hesperomys represents it in the New World—eighty or more species are enumerated. The Pocket Mouse family, (*Saccomyidæ*) has six genera and thirty-three species, all in North America. The Beaver family (*Castoridæ*) has one genus and two species, in America and Europe. The Squirrels (*Sciuridæ*) have eight genera and nearly two hundred species. These are largely from North America, and Europe and Asia. They are not found in the West Indies, in Australia, and in South America as far north as Paraguay.

BLACK RAT.—*Mus rattus.* BROWN RAT.—*Mus decumanus*

Few animals are so well known or so thoroughly detested as the common Brown Rat, or Norway Rat, as it is sometimes erroneously called.

It has spread itself over almost every portion of the globe, taking passages in almost every ship that traverses the ocean, and landing on almost every shore which the vessel may touch. Wherever they set their feet, the Brown Rats take up their abode; and, being singularly prolific animals, soon establish themselves in perpetuity. They are marvellous exterminators of other "vermin," and permit none but themselves to be in possession of the domain which they have chosen. It is a well-known fact that they have driven away the black Rat, and established themselves in its place with wonderful rapidity, having been accidentally brought to England by some vessel in which they had embarked, and found the climate to suit them as a permanent residence. Some of these animals were purposely introduced into Jamaica, in order to extirpate the plantation Rats, which did such damage to the growing crops. They soon drove away the original "vermin;" but like the Saxons when invited to help the Britons, or like the man who was requested to aid the horse against the stag, were found to be more dangerous foes than the enemy whom they had overcome.

The Brown Rat is well fitted for its exterminating mission, as it is a fierce and dangerous animal, and can inflict very painful wounds with its long incisor teeth. An unarmed man would be quite impotent against the attacks of even a small party of old sewer Rats, while a large body of these animals would make but short work of any man, however well he might be armed. There is a wonderful power of combination in the Brown Rat, which enables it to act in concert with its companions, and renders it a truly formidable animal when it chooses to make a combined attack upon man or beast. A number of these animals have been known to attack a cat, and inflict such grievous injuries that the poor creature had to be killed as soon as its evil plight was discovered by its owner. Even a single Rat is no despicable antagonist, and, according to the observations of practical men, could beat off a ferret in fair fight, and would foil any but a properly trained dog.

It is an exceedingly voracious animal, eating all kinds of strange food, and not sparing its own species in times of scarcity. Like the wolves, the Rats will always fall upon and devour one of their companions if it should chance to be wounded, and excite their carnivorous passions by the sight and smell of flowing blood. If a Rat should be caught by a foot or a leg in a steel trap, its former companions will often fly upon the poor captive and tear it to pieces, instead of endeavoring to effect its release. As in such instances the imprisoned limb is left in the teeth of the trap, it has been erroneously supposed that the Rat had severed its own limb in order to set itself free.

From some strange cause, the male Rats far outnumber the females, the proportion being about eight of the former to three or four of the latter. This disproportion of the sexes may possibly be caused by the cannibalistic habits of the Rat, the flesh of the female being more tender than that of the opposite sex. Whatever may be the cause, it is clear that the wider increase of these creatures is greatly checked by the comparative paucity of females.

There is scarcely a greater plague to the farmer, butcher, sailor, provision merchant, or poultry keeper than the Rat, whose mingled craft, daring, and perpetual hunger require the greatest watchfulness and the most elaborate precaution. The havoc which an army of Rats will make among the corn-ricks is almost incredible, while they carry on their depredation with so much secrecy that an unpractised eye would think the stacks to be sound and unharmed. Fortunately they can easily be dislodged from any rick by taking it down, and replacing it on proper "staddles," taking great care that no stray weeds or branches afford a foothold to these persevering marauders. While the rick is being rebuilt, no particular care need be taken to shake the Rats out of the sheaves, for, as they are thirsty animals, they will be forced to leap from the stack in search of water, and then will not be able to return.

Mice can subsist in a stack by means of the rain and dew which moistens the thatch, and may be often seen licking the straws in order to quench their thirst. But the Rats are less tolerant of thirst, and are forced to evacuate their premises. When mice and Rats are found inhabiting the same stack, the former animals reside in the upper parts and the Rats in the lower.

Poultry of all kinds suffer sadly from these carnivorous creatures, which have a custom of invading the hen-roosts by night, and making prey of the fowls as they sit quietly sleeping on their perches. Birds are always indisposed to move during the hours of darkness, so that the cunning rodent finds no difficulty in carrying out its destructive intentions. Rabbit-fanciers have great cause to be indignant with the Rat, for when it once gains access to the hutches, the safety of the entire stock is in imminent danger. The only way to secure the survivors is to remove them at once to some spot which is made Rat-proof. Much of the damage which is done by Rats is laid upon innocent shoulders, the fox and the weasel being the ordinary scape-goats.

The audacity of these animals is really wonderful, especially when they have enjoyed an unmolested life. They have been known to enter a stable and nibble the horn away from the horses' hoofs, or to creep among dogs as they lay sleeping, and gnaw the callous soles of their feet. They have even been known to attack sleeping infants, and to inflict fearful damage before they were detected in their crime. Butchers in our large cities execrate the Rats very sincerely, as they are forced to remove every joint of meat as soon as their business is over for the day, and hang it up in some place which is so well protected that not even a Rat can gain access. Indeed, the black list of their misdemeanors is so extremely long, that even a rapid enumeration of their crimes would more than occupy the entire space devoted to one animal.

Rats are not without their use, especially in large towns, which but for their never-failing appetites would often be in very sad case. Taking any of our large cities, we find that the sewers which underlie their whole extent are inhabited by vast hordes of Rats, which perform the office of scavengers by devouring the mass of vegetable and animal offal which is daily cast into those subterranean passages, and which would speedily breed a pestilence were it not removed by the ready teeth of the Rats. So that, when kept within proper bounds, the Rat is a most useful animal, and will continue to be so until the drainage of towns is conducted in a different manner.

How to keep them to their own proper dominions is no easy task, as their sharp teeth can cut through almost any obstacle, and have been known even to grate away the corner of a particularly hard brick. It is found, however, that if these tunnels be stopped up with mortar or cement well studded with pieces of broken glass, they will not venture their teeth against such a barrier. Moreover, if a few table-spoonfuls of quick-lime be placed in the hole before it is stopped up, it will deter the Rats from coming in that direction, as the lime burns their feet.

Catching them in traps is by no means so easy a process as it appears to be, as the Rat is a very crafty animal, and is moreover gifted with so acute a nose that it can perceive the touch of a human hand upon a trap, and will keep aloof from so dangerous an article. In order to set a trap properly, it is needful to avoid touching it with the bare hand, and to wear thick gloves powerfully scented with aniseed, caraway, or other powerfully-smelling substance. Even in that case, the successful chase of the Rat requires such an accurate knowledge of the animal's habits, and needs so many precautions, that it is almost impossible for an amateur to be permanently successful in that line.

Although the Sewer and the Barn Rats belong to the same species, they are very different in aspect as well as in habits, the former being very much larger than the latter, and much fiercer in disposition. The Sewer Rats remain in their strange habitations during their whole lives, while the Barn Rats are in the habit of making annual migrations as soon as the spring season commences, some betaking themselves to the fields and hedge-rows, while others take up their abode on the river-banks, where they commit sad havoc among the fish.

During this temporary migration, the female Rats make their snug and comfortable nests in any sheltered spot; and before the autumnal season has fairly commenced add a considerable number of new members to the Rat family. It is a wonderfully prolific animal, beginning to breed at four months of age, and having three broods in the year, each brood being from eight to twelve or fourteen in number. When the autumn has set in, the emigrants return to their old quarters, marvellously increased in number.

The female Rat is a most affectionate mother, braving all dangers in defence of her young, and dashing boldly at any real or fancied foe who may happen to alarm her maternal sympathies. Unfortunately for her peace of mind, the paternal Rat is far from partaking of these tender affections, and if he condescends to pay a visit to his young family, only does so with the intention of eating them. Should the mother be at home, she shows such a defiant front that he is fain to decamp from the cradle of his offspring, but if she should perchance happen to be absent from her charge, the result is tragical indeed.

Rats are very cleanly animals, always washing themselves after every meal, and displaying the greatest assiduity in making their toilet. They also exhibit considerable delicacy of palate whenever they find a sufficiency of provisions, although they are in no way nice in their diet when pressed by hunger. If, for example, a party of Rats discover an entrance into a butcher's store-house, they are sure to attack the best parts of the meat, utterly disdaining the neck, the shin, or other coarse pieces.

There is one peculiarity in the structure of the Rat which is worthy of notice. These animals are able not only to ascend a perpendicular tree or wall by the aid of their sharp, hooked claws, but also to descend head foremost with perfect ease. In order to enable them to perform this feat, their hind legs are so made that the feet can be turned outwards, and the claws hitched upon any convenient projections.

However unpromising a subject the Rat may appear, it has often been tamed, and is a very much more educatable animal than could be supposed. It will obey its master's commands with promptitude, and has been known to learn very curious tricks.

For further information on this subject, the reader is referred to a work, entitled "The Rat," by James Rodwell, in which may be found an elaborate account of the animal and its habits, together with much curious and original information.

There is a well-known proverb that Rats always desert a falling house; in which aphorism there is really much truth. One curious example thereof I here offer to the reader.

On page 164 may be seen an account of a cat which had, by some mysterious intuition, migrated from a mill in which she had long lived, and to which she was greatly attached, and which was burned to the ground in a few hours after she had taken her departure. Pussy, it seems, was not the only animal which had been thus forewarned of impending danger, for the Rats also took alarm, and were actually seen upon their journey from their late habitation. They were about one hundred in number, and, starting from the mill some two hours before the fire broke out, proceeded in a compact body towards four stacks belonging to the landlord of the Commercial Inn, and there took up their abode.

A similar account of Rat prescience has been narrated to me by a spectator of the scene.

When the English ship *Leander* was brought into harbor after her voyage, in the year 1803, she was so infested with Rats that a wholesale destruction of these four-footed pests was rendered absolutely necessary, not only for the comfort of the crew, but for the very safety of the vessel. The entire contents of the ship were therefore landed on the wharf, a number of chafing-pans filled with lighted brimstone were placed between decks, and the hatches being battened down, the animals were soon stifled by the suffocating vapors. As soon as the preparation for this wholesale destruction commenced, the Rats took alarm, and endeavored to make their way on shore by traversing the "warps," or ropes by which the vessel was made fast to the shore. Sentinels were accordingly placed by the warps, and furnished with sticks, so that as soon as a Rat came running along the ropes, it was speedily checked by a sharp blow, which struck it from its foot-hold, and knocked it dead or dying into the water, where it soon perished.

It is a curious fact that the Rats were all found lying dead in circles round the braziers, heaped thickly upon each other's bodies. They had instinctively run towards the spots which were comparatively free from vapor, as the heat of the burning coals forced the suffocating smoke to rise from the spot where it was generated.

Some naturalists believe that the Brown Rat as well as the Black Rat originated from Central Asia, especially from India and Persia. Through emigration, caused by deluge and famine, this ugly and detestable creature has in course of time become an inhabitant of every country of the globe. In the beginning of the last century, the Brown Rat immigrated from the Caspian lands to Europe. In Paris, the cosmopolitan Rat was first noticed in the year 1753, a few years after its appearance in England. In Northern America, it was first seen in the year 1755.

From head to tail the Brown Rat measures sixteen to seventeen inches; the tail alone measures about seven inches. Albinos are much more rarely found among them than among their kindred, the other Rats and the Mice.

THE BLACK RAT derives its name from the color of its fur, which is of a grayish-black, instead of the reddish-brown hue which tinges the coat of the brown Rat. The upper jaw projects considerably beyond the lower, and a number of long stiff hairs project though the ordinary fur. In size it is rather less than the above-mentioned animal, and the ears and tail are rather longer in proportion.

It cannot be said with certainty when the Black Rat made its first appearance in Europe. Albertus Magnus is known as the first naturalist who called the Black Rat a European animal. Accordingly the Black Rat must have already been found in Europe in the twelfth century.

In the beginning of the fifteenth century, the bishop of Autun proscribed it, because it caused too much damage everywhere. In Sondershausen, in Germany, a day of fasting was even ordained for the purpose of calling God's wrath upon it. Until the middle of the last century, it was omnipotent in Europe. Since that time the Brown or Wandering Rat has partially displaced it.

The Black Rat is found in all warm and temperate regions, and was in former days extremely numerous, although it has now been gradually driven away from its domains by the larger and more powerful intruder. It is not, however, so rare as is sometimes imagined, and may still be found by those who know where to look for it. According to Mr. Rodwell's theory, the manner in which the brown Rat has supplanted its black relation is not by war, but by love, the stronger males of the brown hue carrying off the black females by force of superior strength, and thus by degrees merging the weaker black race into the powerful brown Rats.

In France the two varieties—for the distinction of species really seems to be but doubtful—live together in perfect harmony, mixing freely with each other, and producing a curious kind of parti-colored offspring.

The skins of these brown-black Rats are considered to be of some value, and they are accordingly pursued by the rat-catchers for the purpose of sale to the furriers. Even the brown Rat is not without its value in commerce, as the prepared skin is said to furnish the most delicate leather for the manufacture of the thumbs of the best kid gloves; and the fur is used as a substitute for beaver in the composition of hats.

Albino, or White Rats, are of no very uncommon occurrence; and when crossed with the black or brown species, their offspring is curiously pied with a darker or lighter hue, according to the color of the parent.

SMALLEST of the mammalia, the elegant little HARVEST MOUSE next claims our attention. The total length of this tiny creature is not quite five inches, its tail being nearly two inches and a half in length. The color of its fur is a delicate reddish-brown, the base of each hair taking the darker tint, and the point warming into red, while the under parts of the abdomen are white. The line of demarcation between the brown and white is well defined.

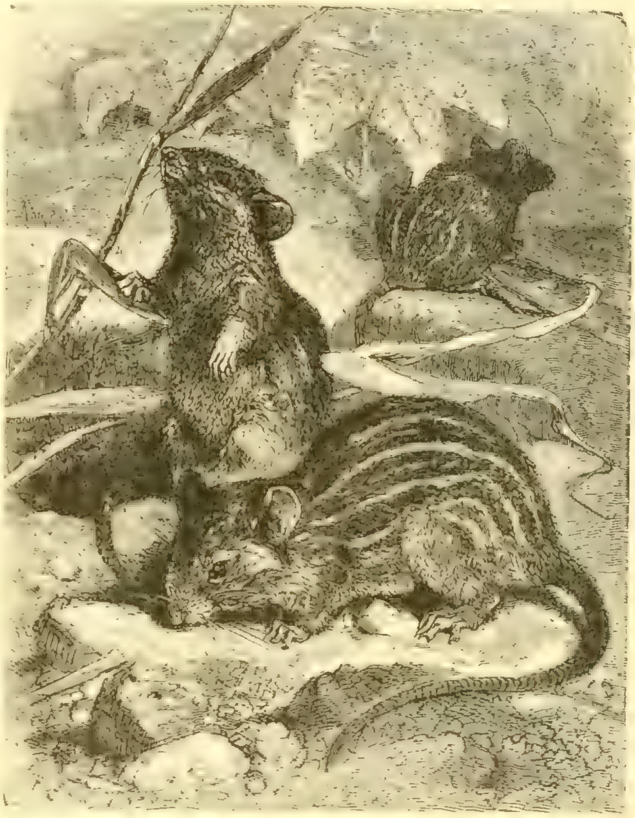
The description which is given of the Harvest Mouse and its wonderful nest, by the Rev. Gilbert White, is so well known that it need only be casually mentioned. I have fortunately had opportunities of verifying his observations by means of a nest which was found in a field in Wiltshire by some mowers.

It was built upon a scaffolding of four of the rank grass-stems that are generally found on the sides of ditches, and was situated at some ten or eleven inches from the ground. In form it was globular, rather larger than a cricket-ball, and was quite empty, having probably been hardly completed when the remorseless scythe struck down the scaffolding and wasted all the elaborate labor of the poor little architect. The material of which it was composed was thin dry grass of nearly uniform substance, and its texture was remarkably loose, so that any object contained in it could be seen through the interstices as easily as if it had been placed in a lady's open-worked knitting basket. There was no vestige of aperture in any part of it, so that the method by which it was constructed seems quite enigmatical.

I am inclined to suppose that the little builder remained in its centre while engaged in its construction, and after weaving it around her, pushed her way out through the loosely woven wall, and re-arranged the gap from the outside. It may be that the nest is the joint work of both sexes, the one remaining inside and plaiting the grass, while her mate brings fresh material, and consolidates the work from the exterior.

Perhaps the young Mice, when snugly packed into their airy cradle, may be fed by the mother from the exterior, by making a temporary opening opposite each little one, and replacing the material when she proceeds to the next in succession. This is Mr. White's suggestion, and seems to be a very probable one. He also wonders how the little nest, which was entirely filled by the bodies of the eight young Harvest Mice that lay cradled in its embrace, could expand so as to accommodate itself to their increasing dimensions. This problem may be answered by the fact that the loose structure of the nest is precisely calculated for such extension, for the materials are so interwoven that the entire structure can be greatly expanded from the interior without losing its spherical shape. Such, at all events, was the case in my own specimen, and is probably so in all.

Very little is known of the habits of the Harvest Mouse in a wild state, except that it is destructive to corn, whether stored in ricks or barns. It is also carnivorous, or rather insectivorous, to no small degree, as was proved by Mr. Bingley, who kept one of these little creatures, and was accustomed to feed it with various insects. This propensity was discovered by mere accident, the Mouse springing with wonderful activity at a blue-bottle fly that happened to buzz against the wires of her cage. Taking the hint, Mr. Bingley caught the fly, and holding it against the wires, was pleased to see the little quadruped dart nimbly out of her hiding-place and take it from his fingers. She always preferred insects to vegetable food. The same observer noticed that the tail of this animal is prehensile.


BARBARY MOUSE.—*Mus barbarus.*

Independently of its small size, the Harvest Mouse may be distinguished from a young ordinary Mouse by its short ears, narrow head, slender body, and less projecting eyes.

THE bold and elegant markings with which the fur of the BARBARY MOUSE is decorated, render it a very conspicuous animal, and when the creature is in captivity, always attract the attention of visitors who happen to pass before its cage.

The dimensions of this animal are greater than those of the common Mouse, while they are smaller than those of the ordinary rat. Its color is very pleasing, the ground tint of the fur being a rich brown, and the stripes of a whitish-yellow, verging by degrees into the white hue of the under portions of the body. These pretty creatures are tolerably hardy, and can endure our climate as well as most animals which have been brought from a hot and arid country. They run about their cage with considerable liveliness, sometimes diving among their bedding, and ever and anon poking their intelligent-looking little heads from among the hay, and tripping about as if pleased to exhibit their beautiful fur. As may be supposed from its title, the animal is a native of Barbary.

It is not devoid of the carnivorous habits of its race, and even when bountifully supplied

ISHER.

with food, has been known to develop its carnivorous nature into cannibalism, eating the body of one of its companions that had died while in the cage.

"Y^{e} little vulgar MOUSE," as it is quaintly termed by old Topsel, is a truly pretty little creature, with its brown-gray back, gray throat and abdomen, soft, velvety fur, its little bright black bead-like eyes, and squirrel-like paws. A detailed description of so familiar an animal would be quite unnecessary, and we will therefore proceed to its habits and manners.

Like the rat, it frequents both town and country, doing an infinity of damage in the former, but comparatively little harm in the latter. In the country it attaches itself mostly to farm-yards, where it gains access to the ricks, and when once firmly established, is not so easily dislodged as its larger relative, the rat. However, if the rick be kept under cover, the Mice cannot make any lengthened stay, for the cover keeps off the rain, on which they chiefly depend for drink, and they are then obliged to leave the stack in search of water. If the rick be placed on staddles, it will be then safe from these little pests.

In the town they are not so objectionable as in the country, for they can only annoy the human inhabitants, and cannot inflict real damage upon them. They are bold little creatures in their way, although easily startled; and, if permitted to carry on their noisy sport undisturbed, run about an inhabited room with perfect nonchalance.

In old buildings in which the walls are papered over canvas, Mice run scuffling and squeaking between the canvas and the plaster, as if they were the legitimate owners of the place, and the tenants were only located there in order to cater for their benefit. Many a wall is riddled with holes that have been made by irritated occupants making furious lunges—always unsuccessfully, by the way—with all sorts of instruments, at the wiry little creatures as they scurry about behind the paper.

They are odd little animals, and full of the quaintest gamesomeness, as may be seen by any one who will only sit quite still and watch them as they run about a room which they specially affect. They are to the full as inquisitive as cats, and will examine any new piece of furniture with great curiosity.

Mice are very easily tamed, and, as far as my own experience goes, the common brown Mouse is more readily brought under subjection, and more docile, than the white or albino variety. I have kept many a set of Mice, brown, white, and mottled, and have always found them to be very susceptible of kindness. To tame a young brown Mouse is an easy task; but it must be remembered that, as all Mice are very cleanly animals, the strictest care is needful to rid their cage of all impurity. Their bedding should be constantly changed, and the false floor of their cage should be double, so that, while one is in use, the other is getting dry after being thoroughly washed. Any soft substance, such as hay, cotton wool, or rags, will suffice for their bedding; but I have found that black cotton wool, or black "wadding," as it is sometimes termed, is fatal to Mice in the course of a single night. Why it should be so, I cannot venture to guess, but that such is the case I have had practical experience.

Mice are cunning creatures, and when they once have taken alarm at a trap, cannot be induced to put themselves within such peril, no matter how strong the inducement may be. For a while it is possible to entrap them by changing the kind of bait as soon as they have begun to learn the result of eating that particular substance; but in a few weeks the trap must be entirely removed until the animals have forgotten it.

It is a marvellously prolific animal, producing its young several times in the course of the year, and at a very early age. The nests are made in any sheltered spot, and formed from any soft substance, such as rags, paper, or wool, that the mother can procure. On taking up some boards in my own room, I once found a Mouse-nest nearly as large as a man's head, composed wholly of scraps of paper, and containing six or seven tiny red, semi-transparent mouselets, through whose little bodies one could almost see the substance of the nest on which they were lying. Another Mouse-nest which I discovered, was made in an old disused harmonicon, which had been put away in a cupboard, and was filled by the Mice with empty nutshells, the refuse of a bag of hazel-nuts which had been placed in the same cupboard; no very enviable bed, as one would fancy, and the reason for its construction not at all obvious.

Before closing this account of the common Mouse, a few words are due to the "Singing Mice," concerning whose musical accomplishments the scientific world is rather at issue, some persons thinking the song to be nothing more than a symptom of bronchitis, and others believing it to be voluntarily produced by the imitative powers of the performers.

I may give a curious instance of "singing" which favors the former of these suppositions. A Mouse had been caught in a trap with weak springs, and being half choked by the wire pressing on its neck, gave vent to a twittering or chirruping not unlike that of a small bird. Other naturalists, however, who have met with examples of singing Mice, seem rather to incline to the opinion that the musical sound is produced by healthy animals, and is not owing to disease. A very interesting letter on this subject has been sent to me by the Rev. R. L. Bampfield, and seems also to favor the latter supposition. By the kind permission of the writer, I am enabled to present the account to the reader, and will leave him to come to his own conclusions on the subject.

"In a former residence of mine, some Mice took up their abode behind the wainscot in the kitchen. From motives which few housekeepers would appreciate, we allowed them to remain undisturbed; and most merry, cheerful little creatures they were.

"It seemed to us that a young brood was being carefully educated; but they did not learn all their accomplishments from their parents. In the kitchen hung a good singing canary, and we observed that by degrees the chirp of the Mice changed into an exact imitation of the canary's song; at least it was so with one, for though several attempted it, one considerably excelled the rest. I am not sure that admiration of the music influenced them, for from the funny facetious way in which it was done, I should rather say it was out of mockery, or at least from a love of imitation. Yet the result was very pleasing; far inferior to the canary's note in volume, strength, and sweetness, it was, perhaps, superior to it in softness and delicacy.

"Often have I listened to it with pleasure in the evening, when the canary was asleep with its head beneath its wing; and more than once have I observed a kitchen-guest glance at the canary, then look round in some astonishment and say, 'Is that a bird, sir, singing?' One trustworthy person assured me that he too had had in his house a similar 'Singing Mouse.' I have, therefore, little doubt that if a young family of Mice were brought up from the first close to a canary or some other songster, some of them would learn to sing."

I have also been favored with an account of a young singing rat, which endeavored to imitate the sounds produced by a piping-bullfinch and an ordinary goldfinch. In the first, the creature entirely failed, but was tolerably successful in its imitation of the mild notes of the goldfinch. The same animal would begin to sing if a melody were played in the minor key, but would give no response to the major. The fondness of Mice for music is already well known, and may afford some clue to their sensitiveness of ear. I believe, by the way, that the untaught cries of all the lower animals, whether they be quadrupeds or birds, are in the minor key.

THERE are many animals which have been saddled with a bad reputation merely on account of an unfortunate resemblance to another animal of really evil character. Among these misused innocents the WATER VOLE is very conspicuous, as the poor creature has been commonly supposed to be guilty of various poaching exploits which were really achieved by the ordinary brown Rat.

It is quite true that Rats are often seen on the river-banks in the act of eating captured fish, but these culprits are only the brown Rats which have migrated from the farm-yards for the summer months, and intend to return as soon as autumn sets in. The food of the true Water Rat, or Water Vole, as it is more correctly named, is chiefly of a vegetable nature, and consists almost entirely of various aquatic plants and roots. The common "mare's-tail," or equisetum, is a favorite article of diet with the Water Vole, and I have often seen it feeding on the bark of the common rush. Many years ago I shot a Water Vole as it was sitting upon a water-lily leaf and engaged in eating the green seeds; and on noticing the kind of diet on which the animal was feeding, I determined to watch the little creatures with more care. My own testimony coincides precisely with those of other observers, for I never yet saw the true

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We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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snub-nosed, short-eared, yellow-toothed Vole engaged in eating animal food, although the brown Rat may be often detected in such an act.

Many communications have been made to me on the subject, written for the most part by persons who have seen water-side Rats engaged in catching and eating fish, and have thought that the delinquents were the true Water Vole. Indeed, the Vole is allied very closely to the beaver, and partakes of the vegetarian character of that animal.

However guiltless the Water Vole may be of piscicapture, it is not altogether a harmless animal, for, independently of weakening the banks by its tunnels, it will sometimes leave the water-side and travel some little distance across the country in search of cultivated vegetables. One of these animals has been seen to cross a large field and enter a garden in which some French beans were growing. The Vole crept up the bean-stalks, and after cutting off several of the pods with its sharp and scissor-like teeth, picked them up and retraced its steps to its home.

The color of the Water Vole is a chestnut-brown, dashed with gray on the upper parts and fading to gray below. The ears are so short that they are hardly perceptible above the fur. The incisor teeth are of a light yellow, and are very thick and strong. The tail is shorter than that of the common Rat, hardly exceeding half the length of the head and body. The average length of a full-grown Water Vole is thirteen inches, the tail being about four inches and three-quarters long. It is not so prolific an animal as the brown Rat, breeding only twice in the year, and producing from five to six young at a birth.

The Campagnol, or Short-tailed Field Mouse, is even more destructive in the open meadows than the common gray mouse in the barns or ricks; for not contenting itself with plundering the ripened crops of autumn, it burrows beneath the ground at sowing-time, and devours the seed-wheat which has just been laid in the earth. Besides these open-air depredations, it makes inroads into ricks and barns, and by dint of multitudinous numbers does very great harm. As its food is entirely of a vegetable nature, it does not enter human habitations, where it would find but a poor chance of a livelihood.

The color of the Campagnol is ruddy brown on the upper surface of the body, and gray on the abdomen and chest. The ears are rounded and very small, closely resembling those of the water vole. The tail is only one-third the length of the body, and the total length of the animal is rather more than five inches. As it belongs to the same genus as the water vole, and is very closely related to that animal, it sometimes goes by the name of Field Vole.

It is a very prolific animal, and its numbers are almost incredibly great in districts where no means have been taken for its destruction. Even in well-cultivated fields, whether of grass or corn, the Campagnol may be found in vast quantities by any one whose eyes are sufficiently accustomed to the task to distinguish the little creature from the earth on which it moves.

It creeps so easily through the green herbage that it scarcely stirs the blades; and it is so similar in its color to the earth as it shows between the leaves, that none but a practised eye can detect them. There is hardly any sign to tell of its presence, except an undefined sense of something red among the grass, which, unless it be immediately pounced upon, fades again into brown, and the thing is gone.

The Campagnol is a water-loving creature, and is oftener found in marshy ground than in meadows which are elevated above the level of the neighboring lands and ditches. A dry summer is very trying to these animals, and a long-continued drought is fatal to hundreds of them.

The Field Vole carries its destructive powers even into woods and plantations, and is often the unknown cause by which some cherished young tree has drooped, withered and died. These little animals are good burrowers, and are in the habit of digging into the ground, and nibbling the living roots of trees and shrubs. Sometimes the mice attack the bark, and by completely stripping it from the circumference of the tree, destroy it as effectually as if it had been cut down with an axe.

There is another species of Field Mouse, in which the tail is much longer in proportion, and the dimensions are altogether smaller. This is the Bank Vole, or Bank Campagnol, and must not be confounded with the Long-tailed Field Mouse, which is not a vole at all, but a veritable Mouse.

FAMILY *Muridæ*—the Mice-like animals, or Murine Rodents—embraces a large number of species. In North America, however, only two sub-families are represented, *Murinæ* and *Arvicolinæ*.

The typical genus *Mus* has no representatives in this country, the mouse and rat being introduced from Europe.

Of the sub-family *Murinæ*, or Mouse-like animals of North America, the group called *Sigmodontes* embraces all the species. This designation is adapted from a peculiar sigmoid or S-like mark on the upper surface of the teeth.

The genus *Neotoma* includes a small number of rat-like animals of large size.

The Florida Wood Rat (*Neotoma floridiana*) is rat-like, and about the size of a Guinea pig. It has a tail inclining to bushy. The Southern United States is its proper *habitat*.

Three other species are known; one, inhabiting California, is eleven inches in length, the largest of the genus, and called the Bushy-tailed Wood Rat.

The genus *Sigmodon* includes one species, the Cotton Rat (*Sigmodon hispidus*). It inhabits the coast region of the Southern States and Mexico. The pelage is hispid, from the presence of stiff hairs.

The genus *Hesperomys* is so named from its including Western murine animals. The species are much like the Old World forms.

The American Field Mouse (*Hesperomys leucopus*), called also White-footed Deer Mouse, inhabits the northern portion of North America as far as Puget's Sound, and east as far as Massachusetts. A variety is found in the Southern States, larger, being about four inches in length, and with a shorter tail. Seven other species of this genus inhabit the Southern and Western portions of the country. Three other sub-species are known, inhabiting the Western plains.

The genus *Ochetodon* includes three little mouse-like creatures, much like the Common House Mouse in appearance, though having essentially different teeth. They are known only in California and Mexico.

In the sub-family *Arvicolinæ* is one genus with one species, the Red-backed Mouse (*Evotomys rutilus*). It inhabits the circumpolar regions, and is not uncommon in Massachusetts.

The genus *Arvicola* includes eight species, distributed over every portion of the United States. The Common American Meadow Mouse (*Arvicola riparius*) is known to all parts of the country above Virginia.

The genus *Synaptomys* is represented by Cooper's Mouse (*Synaptomys cooperi*).

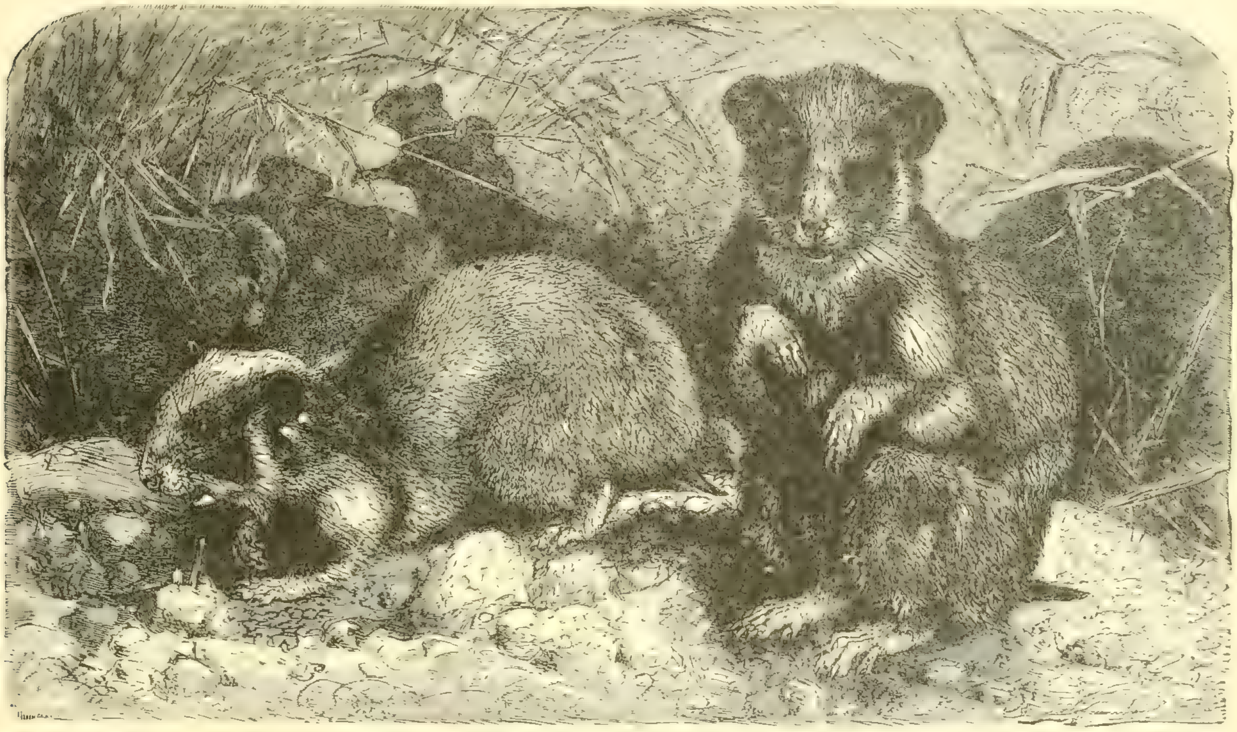
Myodes is a genus closely resembling that of *Cuniculus*, which embraces the Lemmings. *Myodes obensis* is common to Asia and North America.

THE short, sturdy, stupid rodent which is so famous under the name of the HAMSTER, is widely spread over many parts of Northern Europe, where it is an absolute pest to the agriculturists, who wage unceasing war against so destructive an animal. Before proceeding to the habits and character of the Hamster, a short description of its external appearance will be necessary.

The color of its fur is a grayish-fawn on the back, deepening into black on the under portions of the body, and softening into a yellow hue upon the head and face. The otherwise uniform tinting of the fur is relieved by some patches of whitish-yellow upon the cheeks, shoulders, and sides. The creature is furnished with two large cheek-pouches, which are capable of containing a considerable amount of food, and which can be inflated with air at the pleasure of the animal. The length of the adult Hamster is about fifteen inches, the tail being only three inches long.

The Hamster is most destructive to the crops, whether of corn, peas, or beans, and when the autumn approaches, begins to plunder the fields in a most systematic manner, for the purpose of laying up a winter store of provisions. By dint of dexterous management, the animal fills its cheek-pouches with grain, pressing it firmly with its paws, so as to lose no space, and then carries off its plunder to its subterranean treasury, where it disgorges the contents of the pouches, and returns for another supply. The husbandmen are so well aware of this propensity that they search after the habitation of the Hamster after the harvest is over, and often recover considerable quantities of the stolen grain. The destructive capability of the animal may be gathered from the fact that a single Hamster has been known to hoard no less than sixty pounds of corn in its home, while a hundred weight of beans have been recovered from the storehouses of another specimen.

The skin of the Hamster is of some value in commerce, so that the hunters make a double use of a successful chase, for they not only recover the stolen property of the agriculturist, but gain some profit by selling the skins.



HAMSTER.—*Cricetus frumentarius.*

The burrow of the Hamster is a most complicated affair, and not very easy to describe. Each individual has a separate burrow, and not even in the breeding season do the male and female inhabit the same domicile. At some depth below the surface of the earth are several rather large chambers, communicating with each other by horizontal passages. In one of these chambers the creature lives, and in the others it places its store of provision. There are at least two entrances to each burrow, one being almost perpendicular, and the other sloping. Sometimes there are more than two entrances to the chambers, but there are never less than that number. The depth of the chambers is from three to five feet. Each burrow is only intended to serve for one season, and is abandoned at the end of winter.

As the Hamster is in the habit of throwing the excavated earth from the oblique burrow, technically called the "creeping-hole," its locality is discovered by means of the mound of loose earth which is heaped at its entrance. Eighty thousand of these animals have been killed in one year within a single district.

The Hamster is a very prolific animal, as appears from the fact that it still holds its own in spite of the constant persecution to which it is subjected by the agriculturists and the regular hunters. There are several broods in each year, the average number of each family being from seven to ten or twelve. As soon as the young Hamsters are able to shift for themselves, an event which occurs in a wonderfully short time, they leave the maternal home, and dig separate burrows.

The strangest part of the Hamster's character is its dull, unreasoning ferocity, which is utterly incapable of comprehending danger, and causes the animal to attack any kind of opponent, whether animate or not. An irritated Hamster will fly upon a dog, a man, or a horse, without the least hesitation. If a cart were to crush it, it would try to bite the wheel; if a stone were to roll over it, it would turn upon the lifeless stone; threaten it with a stick, and it fastens upon the senseless weapon with malign fury; and when opposed by a bar of iron nearly red hot, it has been known to grasp the burning metal in its teeth, and to retain its hold in spite of the pain which it must have suffered. This combative disposition leads it to fight desperately with its own species, caring nothing for sex or age; and it has actually happened that when a pair of these animals have been placed together in a cage, the male has been killed and partly eaten by his disconsolate widow.

THE LEMMING.—*Myodes lemmus.*

The food of this animal is chiefly vegetable, but is varied by animal diet, such as worms, insects, mice, small birds, lizards, frogs, and other such vermin. It is a nocturnal animal, and achieves its robberies under cover of the darkness of night. It can hardly be termed a true hibernating animal, as it is quite lively for a considerable portion of the winter, feeding on its ample stores for nearly two months, and becoming very fat by the combined influence of inactivity and good feeding. Through a portion of the winter it becomes torpid, but awakes early in the spring, ready to renew its depredations in the fields. During the spring and summer months its food consists chiefly of leaves and various herbage.

At uncertain and distant intervals of time, many of the northern parts of Europe, such as Lapland, Norway, and Sweden, are subjected to a strange invasion. Hundreds of little dark, mouse-like animals sweep over the land, like clouds of locusts suddenly changed into quadrupeds, coming from some unknown home, and going no one knows whither. These creatures are the **Lemmings**, and their sudden appearances are so entirely mysterious, that the Norwegians look upon them as having been rained from the clouds upon the earth.

Driven onwards by some overpowering instinct, these vast hordes travel in a straight line, permitting nothing but a smooth perpendicular wall or rock to turn them from their course. If they should happen to meet with any living being, they immediately attack, knowing no fear, but only urged by undiscriminating rage. Any river or lake they swim without hesitation, and rather seem to enjoy the water than to fear it. If a stack or a corn-rick should stand in their way, they settle the matter by eating their way through it, and will not be turned from their direct course even by fire. The country over which they pass is utterly devastated by them, and it is said that cattle will not touch the grass on which a Lemming has trodden.

These migrating hosts are accompanied by clouds of predaceous birds, and by many predaceous quadrupeds, who find a continual feast spread for them as long as the Lemmings are on their pilgrimage. While they are crossing the rivers or lakes, the fish come in for their share of the banquet, and make great havoc among their columns. It is a very remarkable fact that the reindeer is often seen in chase of the Lemmings; and the Norwegians say that the deer is in the habit of eating them. This statement, however, seems to be rather of doubtful character. The termination of these extraordinary migrations is generally in the sea, where the survivors of the much-reduced ranks finally perish. Mr. Lloyd mentions that just before his visit to Wermeland, the Lemming had overrun the whole country. The primary cause of these strange migrations is generally thought to be hunger. It is fortunate for the country that these razzias only occur at rare intervals, a space of some ten or fifteen years generally elapsing between them, as if to fill up the places of those which were drowned or otherwise killed in the preceding migration.

The Lemming feeds upon various vegetable substances, such as grass, reeds, and lichens, being often forced to seek the last-named plant beneath the snow, and to make occasional air-shafts to the surface. Even when engaged in their ordinary pursuits, and not excited by the migratorial instinct, they are obstinately savage creatures. Mr. Metcalfe describes them as swarming in the forest, sitting two or three on every stump, and biting the dogs' noses as they came to investigate the character of the irritable little animals. If they happened to be in a pathway, they would not turn aside to permit a passenger to move by them, but boldly disputed the right of way, and uttered defiance in little sharp, squeaking barks.

The color of the Lemming is dark brownish-black, mixed irregularly with a tawny hue upon the back, and fading into yellowish-white upon the abdomen. Its length is not quite six inches, the tail being only half an inch long.

The Collared Lemming (*Cuniculus torquatus*) is the only one of the genus found in America, and is identical with that of Northern Asia. The Cree Indians call it White Bear Mouse. It also is named Hair-tailed Rat, Hudson's Rat, and Hudson's Bay Lemming. In winter it is pure white.

The family *Haplodontidæ* is a very peculiar one, founded upon the existence of a single species of Rodent, inhabiting only the northwestern portion of the United States—in Washington Territory, from the Pacific Ocean to the Rocky Mountains.

The native name is "Sewellell;" its systematic designation *Haplodon rufus*. In general aspect it is not unlike the woodchuck; its smaller head at once distinguishes it, as well as its inferior size. It burrows, and is gregarious in nature. Its voice is a shrill whistle; its food of a vegetable nature.

It was first brought to notice by Lewis and Clark, the U. S. explorers, in 1805. Mr. Gibbs, the ethnographer, visited the region inhabited by these rare creatures. He saw them in communities like those of the prairie dog. They sat upright at the mouths of their burrows, and whistled much like the latter animal.

A very singular habit was noticed; they cut a kind of herb, and laid the pieces in bundles on any neighboring log or prominence; suggesting the frugal husbandry of the country matron, who cuts and dries her medicinal herbs.

Its habits of breeding are not precisely known; but it is thought they have at least three broods in a year.

The common Beaver has earned a world-wide reputation by the wonderful instinct which it displays, independently of its very great value in producing costly fur and perfume.

This animal is found in the northern parts of Europe and Asia, but is found in the greatest profusion in North America. It is generally supposed that there is but one species of true Beaver, and that the Beaver of Europe and Asia is specifically identical with that of America, even though certain small differences of fur and coloring may be discerned between them. The social Beaver of Northern America is a truly wonderful animal, displaying a singular mixture of reason and instinct, together with a curious absence of both on occasions. The best account of this animal is to be found in Audubon and Bachman's valuable work on the quadrupeds of North America, to which work I am indebted for the following particulars.

The Beaver lives in societies, varying considerably in number, and united together in the formation of works which may fairly be considered as belonging to the profession of the engineer. They prefer to make their habitations by small clear rivers and creeks, or close to large springs, although they sometimes take up their abode on the banks of lakes.

Lest they should not have a sufficient depth of water in all weathers and at all seasons, the Beavers are in the habit of building veritable dams, for the purpose of raising the water to the required level. These dams are composed of tree-branches, mud, and stones, and in order effectually to resist the action of the water, are about ten or twelve feet in thickness at the bottom, although they are only two feet or so wide at the summit. When the different parts of the stream run with varying velocity, the formation of the dam is really a triumph of engineering skill, for wherever the stream is gentle, the dam is built straight across it; but wherever the current runs smartly, the dam is curved so as to present a convex surface to its force. It often happens that when a dam has been made for some years, its dimensions become very large, in consequence of the trees and branches that are intercepted by it, and in process of time it sprouts thickly with vegetation, and even nurtures trees of some dimensions.

In forming the dam, the Beaver does not thrust the ends of the stakes into the bed of the river, as is often supposed, but lays them down horizontally, and keeps them in their place by heaping stones and mud upon them. The logs of which the dam is composed are about three feet in length, and vary extremely in thickness. Generally, they are about six or seven inches in diameter, but they have been known to measure no less than eighteen inches in diameter. An almost incredible number of these logs are required for the completion of one dam, as may be supposed from the fact that a single dam will sometimes be three hundred yards in length, ten or twelve feet thick at the bottom, and of a height varying according to the depth of water.

Before employing the logs in this structure, the Beavers take care to separate the bark, which they carry away, and lay up for a winter store of food.

Near the dams are built the Beaver-houses, or "lodges," as they are termed; edifices as remarkable in their way as that which has just been mentioned. They are chiefly composed of branches, moss, and mud, and will accommodate five or six Beavers together. The form of an ordinarily sized Beaver's lodge is circular, and its cavity is about seven feet in diameter by three feet in height. The walls of this structure are extremely thick, so that the external measurement of the same lodges will be fifteen or twenty feet in diameter, and seven or eight feet in height. The roofs are all finished off with a thick layer of mud, laid on with marvellous smoothness, and carefully renewed every year. As this compost of mud, moss, and branches is congealed into a solid mass by the severe frosts of a North American winter, it forms a very sufficient defence against the attacks of the Beavers' great enemy, the wolverene, and cannot readily be broken through, even with the help of iron tools. The precise manner in which the Beavers perform their various tasks is not easy to discern, as the animals work only in the dark.

Around the lodges the Beavers excavate a rather large ditch, too deep to be entirely frozen, and into this ditch the various lodges open, so that the inhabitants can pass in or out without hindrance. This precaution is the more necessary, as they are poor pedestrians, and never travel by land as long as they can swim by water. Each lodge is inhabited by a small number of Beavers, whose beds are arranged against the wall, each bed being separate, and the centre of the chamber being left unoccupied.

In order to secure a store of winter food, the Beavers take a vast number of small logs, and carefully fasten them under water in the close vicinity of their lodges. When a Beaver feels hungry, he dives to the store heap, drags out a suitable log, carries it to a sheltered and dry spot, nibbles the bark away, and then either permits the stripped log to float down the stream, or applies it to the dam.

Their teeth are wonderfully powerful and sharp, and their jaws are possessed of singular strength.

So sharp are their teeth, and with such address does the animal use them, that a tame Beaver has repeatedly been seen to take a potato or an apple in his fore-paws, to sit up on his hind feet, and by merely pressing the apple against his lower incisors, and manipulating it

BEAVER.

dexterously, to peel it as really as if the operation had been performed by human hands with the aid of a knife.

Not all the Beavers employ themselves in these united labors, for there are some which, like drones, refuse to take any part in the proceedings, and are technically called "Les paresseux," or the Idlers, by the Beaver-hunters. These animals make no dam and build no house, but content themselves with excavating long tunnels and taking up their abode therein. Several of these idlers inhabit the same burrow, and as they are always males, it is supposed that they must have been conquered in the contests which take place between most male animals while they are seeking their mates, and that they must have retired into comparative solitude until they have gained sufficient strength and courage to renew the fight. These idlers are gladly welcomed by the hunters, for they are easily caught, and a skilful trapper thinks himself ill-used if he does not capture every idler that he may meet.

We now must bestow a little time on the curious odoriferous substance which is called "castoreum" by the learned, and "bark-stone" by the trappers. This substance is secreted in two glandular sacs which are placed near the root of the tail, and gives out an extremely powerful odor.

To the castoreum the trapper is mostly indebted for his success, for the Beavers are strangely attracted by this substance, and if their nostrils perceive its distant scent, the animals will sit upright, sniff about in every direction, and absolutely squeal with excitement. Taking advantage of this curious propensity, the hunter always carries a supply of castoreum, in a closed vessel, and when he comes to a convenient spot for placing his trap, he sets the trap and then proceeds to manufacture his bait. This process is simple enough, consisting merely of taking a little twig of wood about nine inches long, chewing one end of it and dipping it in the castoreum. The trap is now laid so as to be covered by about six inches of water, and the stick arranged so that its perfumed tip projects from the water. Any Beaver which scents this bait will most certainly come to it, and will probably be captured in the trap.

Connected with this strange mode of baiting a trap, is a habit which has only recently been brought before the public by the researches of Messrs. Audubon and Bachman.

If two Beaver lodges are tolerably near each other, the inhabitants of the one lodge, which we will call lodge A, go to a little distance for the purpose of ridding themselves of the superabundant castoreum. The Beavers of lodge B, smelling the castoreum, go to the same spot, and cover the odoriferous substance with a thick layer of earth and leaves. They then place their own castoreum upon the heap, and return home. The inhabitants of lodge A then go through precisely the same process, until they have raised a mound some four or five feet in height.

To return to the baited trap spoken of in the last paragraph but one. If the Beaver which smells the bait is a young one, it will almost certainly be captured; but if it should chance to be an old and experienced animal, it will not only avoid capture, but render the trap useless until it has been re-set. For instead of trying to get at the bait, it fetches quantities of mud and stones, heaps its load upon the trap until it has raised a small mound, and after placing its own superabundant castoreum upon the little hillock, goes away in safety.

In spite of their store of provisions, the Beavers become very thin during the winter months, so that they are in bad case when spring comes in. However, the succulent diet which they then find has a rapid and beneficial effect upon them, and by the beginning of autumn they are quite fat. By study of the Beaver's habits, the trappers are enabled to prognosticate the kind of weather which is likely to happen. For example, as it is well known that the Beavers always cut their winter's store of wood in good season, the fact of their early commencement of this labor shows that winter will be earlier than usual.

The color of the long shining hairs which cover the back of the Beaver is a light chestnut, and the fine wool that lies next to the skin is a soft grayish-brown. The total length of the animal is about three feet and a half; the flat, paddle-shaped, scale-covered tail being about one foot in length. The flesh of the Beaver is eaten by the trappers, who compare it to flabby pork. The tail is something like beef marrow, when properly cooked, but it is too rich and oily to suit the taste of most persons. The female Beaver produces about three or four young at a litter, and the little creatures are born with open eyes.

The Beaver (*Castor fiber*) is regarded by some naturalists as being unique in species. Two well-marked varieties at least are known. The American one is larger than the European. The habits are different in some respects. The European form does not build dams and houses to the extent seen in this country.

The Beaver is the largest of living rodents save the great Capybara of South America, which is about a third larger.

The *habitat* of the Beaver extends from the borders of the Arctic Seas to the Gulf of Mexico, and from the Atlantic to the Pacific. They are seldom found now east of the Mississippi. Occasionally one is captured in Maine, New York, and Virginia. In some portions of Canada and California they are yet numerous.

A small number of Beavers are known to inhabit a stream that enters into the west branch of the St. Regis River, in Franklin County, New York. It is probably the colony referred to by Dr. DeKay in his New York State Reports on Natural History, in 1842. Considerable pains is taken to preserve this colony, as these creatures are fast going out of existence.

Mr. Morgan, of Syracuse, New York, has contributed the most valuable amount of literature, on the subject of the Beaver, extant. In the Central Park Museum are two logs of trees sent by him. These are of yellow birch, a favorite kind with the Beaver, and they show the effects of the gnawing to the extent of being cut about two-thirds through. The diameter of the trees is about eighteen inches. One is cut considerably more on one side than on the other. It is said that the creature exercises an amount of intelligence that prompts him to thus cut the trunk, that it may fall as near to the requisite position as can be. These larger trunks are used for the first layers in dam-building. Mr. Morgan is the first scientific person that has ever succeeded in witnessing the work of Beavers. The creatures work at night, and are very shy, immediately retiring when disturbed by the slightest sound.

Mr. Morgan was a civil engineer, on duty near Lake Superior. Being camped near the Beaver meadows, he watched many nights, and at last, during a moonlight night, was able to make some very interesting observations of the habits of these animals.

His book on the American Beaver is full of new and valuable material. His descriptions of the construction of canals by Beavers are wonderful. He found a series of canals cut in the direction of trees that were desirable for use in building dams. These canals were connected with the water of the pond or lake, and any logs that the Beavers had prepared were easily transported through them. The Beaver's fore-legs are very short, and are not used in swimming. When they moved the logs in the water, the paws were placed upon them, and while the hind legs, well webbed, were making vigorous strokes behind, the log was pushed and guided to its destination. Morgan says the Beaver does not use the tail for any purpose but that of steering while swimming. He regards the old stories about the use of the tail as a trowel, as exploded and untrue. One of the canals measured by Mr. Morgan was five hundred feet in length—the trees coveted by the animals being that distance away from the lake.

THE COYPU RAT, or RACOONDA, as it is sometimes termed, is a native of Central America, where it is found in such great numbers that its beautiful fur is imported into Europe in very large quantities.

The color of this animal is a light reddish-brown, the hairs being variegated with both tints, not unlike that of the beaver in character and general appearance. Indeed, the creature bears a great resemblance to a miniature beaver, with the exception of its tail, which is long and rounded, instead of being flattened like that of the true beaver. The incisor teeth are a light reddish-orange, and are very conspicuous even at some distance. The length of a full-grown Coypu is about two feet six inches, its tail being about fifteen inches long.

It is a quick and lively animal, and very amusing in its habits. It swims nearly, if not quite, as well as the beaver, using its webbed hind feet in much the same manner. It is wonderfully dexterous in the use of its fore-paws, which it uses as if they were hands, while it sits upright on its hinder paws and tail. I have often watched the funny antics of the Coypus in the Zoological Gardens, and have been much amused by the manner in which they traverse their domains, and examine everything that seems to be novel. If a tuft of grass is thrown to them, they pick it up in their fore-paws, shake it violently, in order to get rid of the earth that clings to the roots, and then, carrying it to the water-side, wash it with a rapid dexterity that might be envied by a professional laundress.

While swimming it looks very like a magnified water vole, and is remarkably quick and agile in its movements; but its gait on land is clumsy and awkward. It seems to be equally at home in salt or fresh water, inhabiting the banks of rivers or the shores of the sea creeks, according to the locality in which it is found, and living in burrows which it excavates along the banks.

COYPU RAT, OR RACOONDA.—*Myopotamus coypu.*

It is said to be a tolerably powerful animal, and to make no despicable resistance to the dogs which are employed in its chase. It is, however, naturally of a gentle disposition, and can be rendered very tame by those who bestow proper attention upon it.

THE ONDATRA, MUSQUASH, or MUSK RAT, is a native of Northern America, where it is found in various places above the twentieth degree of north latitude.

The color of this animal is a dark brown on the upper portions of its body, tinged with a reddish hue upon its neck, ribs, and legs, the abdomen being ashy gray; the tail is of the same dark hue as the body. In total length it rather exceeds two feet, of which measurement the tail occupies about ten inches. The incisor teeth are bright yellow, and the nails are white. The whole coloring of the animal is so wonderfully like the hue of the muddy banks on which it resides, that a practised naturalist has often mistaken the Ondatras for mere lumps of mud until they began to move, and so dispelled the illusion. The hinder feet of the Ondatra are well webbed, and their imprint on the soft mud is very like that of a common duck.

The food of the Ondatra in a wild state appears to be almost wholly of a vegetable nature; although, when confined in a cage, one of these animals has been seen to eat muscles and oysters, cutting open the softest shells, and extracting the inmates, and waiting for the hard-shelled specimens until they either opened of their own accord or died. Although the Ondatra is a clumsy walker, it will sometimes travel to some distance from the water-side, and has been noticed on a spot nearly three-quarters of a mile from any water. These animals have also been detected in ravaging a garden, which they had plundered of turnips, parsnips, carrots, maize, and other vegetables. The mischievous creatures had burrowed beneath them, bitten through their roots, and carried them away to their subterranean storehouses. The maize they had procured by cutting the stalks near the level of the ground.

The Ondatra lives mostly in burrows, which it digs in the banks of the river in which it finds its food, but sometimes takes up its abode in a different kind of habitation, according to the locality and the soil. In the stiff clay banks of rivers the Ondatra digs a rather complicated series of tunnels, some of them extending to a distance of fifteen or twenty yards, and sloping upwards. There are generally three or four entrances, all of which open under water, and unite in a single chamber, where the Ondatra makes its bed. The couch of the luxurious animal is composed of sedges, water-lily leaves, and similar plants, and is so large as to fill a bushel basket. On marshy ground, and especially if it be supplied by springs, the Ondatra builds little houses that rise about three or four feet above the water, and look something like small haycocks.

ONDATRA, OR MUSK RAT.—*Fiber zibethicus.*

As the fur of the Ondatra is rather valuable, and the flesh is considered to be nearly as good as that of the wild duck, it is rather persecuted by the human inhabitants of the same land, as well as by the regular fur hunters. If these creatures have taken up their abode in burrows, the hunters capture them by stopping up all the holes which they can reach, and intercepting the animals as they try to escape; but if the ground be marshy, and they live in houses or "lodges," a different plan is adopted. Being armed with a four-pronged barbed spear, the hunter creeps quietly towards one of the houses, and with the full strength of his arm drives the barbed prongs completely through the frail walls, transfixing one or more of the inhabitants. His companion, who is furnished with an axe, immediately hurls down the remainder of the wall, and secures the unfortunate victims who are held down by the merciless steel.

The habits of the Ondatra are very curious, and are admirably related by Messrs. Audubon and Bachman, in the work to which allusion has already been made:—

"Musk rats are very lively, playful animals when in their proper element, the water; and many of them may be occasionally seen disporting themselves on a calm night in some mill-pond or deep sequestered pool, crossing and recrossing in every direction, leaving long ripples in the water behind them, while others stand for a few moments on little hurdles or tufts of grass, or on stones or logs, on which they can get a footing above the water, or on the banks of the pond, and then plunge one after the other into the water. At times one is seen lying perfectly still on the surface of the pond or stream, with its body widely spread out, and as flat as can be. Suddenly it gives the water a smart slap with its tail, somewhat in the manner of the beaver, and disappears beneath the surface instantaneously, going down head foremost, and reminding one of the quickness and ease with which some species of ducks and grebes dive when shot at.

"At the distance of ten or twenty yards, the Musk Rat comes to the surface again, and perhaps joins its companions in their sports; at the same time others are feeding on the grassy banks, dragging off the roots of various kinds of plants, or digging underneath the edge of the bank. These animals seem to form a little community of social, playful creatures, who only require to be unmolested in order to be happy.

"Should you fire off a fowling-piece while the Musk Rats are thus occupied, a terrible fright and dispersion ensues; dozens dive at the flash of the gun, or disappear in their holes; and although in the daytime, when they see imperfectly, one may be shot while swimming, it is exceedingly difficult to kill one at night. In order to ensure success, the gunner must be concealed, so that the animal cannot see the flash, even when he fires with a percussion lock."

Traps are also largely employed for the destruction of this gentle, but, unfortunately for itself, valuable animal. The traps are so arranged, that when the creature is taken, and struggles to get free, it jerks the trap into the water, and is thus drowned. If its companions discover it while still entrapped, they behave in the manner of the brown Rats, and tear their imprisoned companion to pieces. If one of these animals is shot, and not immediately retrieved, the survivors surround the dead body of their companion, and carry it off to their homes from the reach of its murderer. In character it is quiet and gentle, and although armed with such powerful teeth, makes no offensive use of them, even when handled by man for the first time.

The shy and retiring **Hydromys**, or **Beaver Rat**, is not a very rare animal in its native country, but as, in addition to its natural timidity, it is nocturnal in its habits, it is but seldom seen by casual observers. It is a native of Van Diemen's Land, and is found inhabiting the banks of both salt and fresh water. It is an admirable swimmer and diver, reminding the spectator of the water vole of Europe. Like that animal, it has a habit of sitting upright, supported by its hind paws and tail, while it employs the fore-feet for the conveyance of food to its mouth.

The color of the Beaver Rat's fur is as follows. The neck and upper parts of the body are of a dark rich brown, which is washed with a light golden hue along the sides of the face, shoulders, and the flanks, as far as the hind limbs. The under surface of the body is golden yellow, and has earned for the animal the name of "chrysogaster," which signifies "golden-bellied." The basal half of the tail is black, and the remaining moiety is white. The total length of the Beaver Rat is about two feet, the tail being the same length as the body. The hinder feet are webbed.

The **Ground Pig** is one of the links between the beavers and the porcupines, and has a considerable affinity with the latter animals.

It is found in many parts of Southern Africa, as well as on the coast of Guinea, where it is not at all uncommon. The hair of this animal is rather peculiar, and approximates closely to the quill-hairs of the true porcupines, being either flat and grooved above, or developed into flexile spines. The tail is but sparely covered with hair, and is rather short in proportion to the size of its owner. The hinder feet are only furnished with four toes, armed with large, rounded, and rather blunt claws. The ears are short and rounded.

The **Porcupine** has long been rendered famous among men by the extraordinary armory of pointed spears which it bears upon its back, and which it was formerly fabled to launch at its foes with fatal precision.

This animal inhabits many parts of the world, being found in Africa, Southern Europe, and India. The spines, or quills, with which it is furnished, vary considerably in length, the longest quills being flexible, and not capable of doing much harm to an opponent. Beneath these is a plentiful supply of shorter spines, from five to ten inches in length, which are the really effective weapons of this imposing array. Their hold on the skin is very slight, so that when they have been struck into a foe, they remain fixed in the wound, and, unless immediately removed, work sad woe to the sufferer. For the quill is so constructed, that it gradually bores its way into the flesh, burrowing deeper at every movement, and sometimes even causing the death of the wounded creature. In Africa and India, leopards and tigers have frequently been killed, in whose flesh were pieces of Porcupine quills that had penetrated deeply into the body, and had even caused suppuration to take place. In one instance, a tiger was found to have his paws, ears, and head filled with the spines of a Porcupine, which he had vainly been endeavoring to kill.

Conscious of its powers, the Porcupine is not at all an aggressive animal, and seldom, if ever, makes an unprovoked attack. But if irritated or wounded, it becomes at once a very unpleasant antagonist, as it spreads out its bristles widely, and rapidly backs upon its opponent. There are few horses which will face an irritated Porcupine ; and even the preliminary rustle of the quills with which a Porcupine generally prepares every attack, is sufficient to make an ordinary horse flee in terror. The rustling sound is produced by a number of hollow quills which grow upon the Porcupine's tail, and which, when that member is agitated, clash against each other with a sound very like the peculiar ruffling of a peacock's train.

The Porcupine is a nocturnal animal, seldom venturing out of its retreat as long as the sun is above the horizon, and is therefore not often seen even in the localities which it most prefers. It is said not to require the presence of water, but to quench its thirst by eating the succulent roots and plants which it digs out of the ground. Its food is entirely of a vegetable nature, and consists of various kinds of herbage, as well as of bark, fruit, and roots. This animal takes up its abode in deep burrows which it excavates, and in which it is supposed to undergo a partial hibernation.

As the spines of the Porcupines are of some commercial value, and are used for many purposes, the chase of the animal is rather popular in the countries which it inhabits, and derives a further interest from the fact that the Porcupine, although a timid creature, can make a very powerful resistance when it is driven to despair. In fighting, it depends wholly on its quills, and does not attempt to make the least use of its strong and sharp incisor teeth, which are able to cut their way through the hardest wood as if it were butter, and would inflict most dangerous wounds. So far, indeed, is it from making any use of these formidable weapons, that its first care is to protect its head, being probably led to that course of action by its fear for its nose, which is so sensitive that the animal is stunned by a comparatively slight blow on that organ.

It does not appear to be very susceptible of domestication, probably because it cannot find teachers who are sufficiently fearless of its quills to pay very close attention to it. With the exception of the hollow quills in the tail, the spines are encircled with alternate rings of black and white, producing a very rich contrast of coloring. The upper parts of the body are covered with hair instead of quills, and upon the head and neck there is a kind of crest, composed of very long stiff hairs, which can be erected or depressed at pleasure. Like the hedgehog, it can coil itself into a ball when it is surprised at a distance from its haven of refuge, and can present such an array of threatening spikes, that it is quite safe from any enemy excepting man. When, however, the animal is at peace, it is capable of depressing the bristling spears, and can squeeze itself through an opening which would appear at first sight to be hardly large enough to permit the passage of an animal of only half its size.

The total length of the common Porcupine is about three feet six inches, the tail being about six inches long. Its gait is plantigrade, slow, and clumsy, and as it walks, its long quills shake and rattle in a very curious manner. Its muzzle is thick and heavy, and its eyes small and pig-like.

SELMAR HESS, PUBLISHER, N. Y.

PORCUPINE.

THE TUFTED-TAILED PORCUPINE is even a more singular animal than that which has just been described.

The quills which cover the body are very short in proportion to the size of the animal, and instead of preserving the rounded, bamboo-like aspect of the ordinary Porcupine-quills, are flattened like so many blades of grass. The tail is scaly throughout a considerable part of its length, but at the tip is garnished with a tuft of most extraordinary-looking objects, which can hardly be called hairs or quills, but, as Buffon remarks, look very like narrow, irregular strips of parchment. The coloring of the quills is rather various, but, as a general rule, they are black towards the extremity and white towards the base. They are very sharply pointed, and are remarkable for a deep groove that runs along their entire length. Upon the head the quills are not more than one inch long, but on the middle of the body they reach four or even five inches. Among these quills there are a few long and very slender spines or bristles, which project beyond the others.

TUFTED-TAILED PORCUPINE.—*Atherura africana.*

The Tufted-tailed Porcupine has been found at Fernando Po, and is an inhabitant of India and the Peninsula of Malacca.

THE URSON, CAWQUAW, or CANADIAN PORCUPINE, is a native of North America, where it is most destructive to the trees among which it lives.

Its chief food consists of living bark, which it strips from the branches as cleanly as if it had been furnished with a sharp knife. When it begins to feed, it ascends the tree, commences at the highest branches, and eats its way regularly downward. Having finished one tree, it takes to another, and then to a third, always choosing those that run in the same line; so that its path through the woods may easily be traced by the line of barked and dying trees which it leaves in its track. A single Urson has been known to destroy a hundred trees in a single winter, and another is recorded as having killed some two or three acres of timber.

It is a tolerably quiet animal, and easily tamed; although subject to sudden fits of alarm at any strange object. One of these animals was so entirely domesticated, as to come voluntarily, and take vegetables or fruit from the hand of its master, and would rub itself against him after the manner of an affectionate cat. When irritated or alarmed, it has a curious habit of striking sharply with its tail, which is thickly set with short quills, and causing no small damage to the object of attack. In the work of Messrs. Audubon and Bachman is a very amusing little story of the manner in which the tame Urson above mentioned repelled an attack made upon it by a fierce dog.

"A large, ferocious, and exceedingly troublesome mastiff, belonging to the neighborhood, had been in the habit of digging a hole under the fence, and entering our garden. Early one morning we saw him making a dash at some object in the corner of the fence, which proved to be our Porcupine, which had, during the night, made its escape from the cage.

"The dog seemed regardless of all its threats, and probably supposing it to be an animal not more formidable than a cat, sprang upon it with open mouth. The Porcupine seemed to swell up in an instant to nearly double its size, and as the dog pounced upon it, it dealt him such a sidewise blow with its tail, as to cause the mastiff to relinquish his hold instantly, and set up a loud howl in an agony of pain. His mouth, tongue, and nose were full of Porcupine quills. He could not close his jaws, but hurried, open-mouthed, off the premises. It proved to him a lesson for life, as nothing could ever afterwards induce him to revisit a place where he had met with such an unneighborly reception. Although the servants immediately extracted the spines from the mouth of the dog, we observed that his head was terribly swelled for several weeks afterwards, and it was months before he finally recovered."

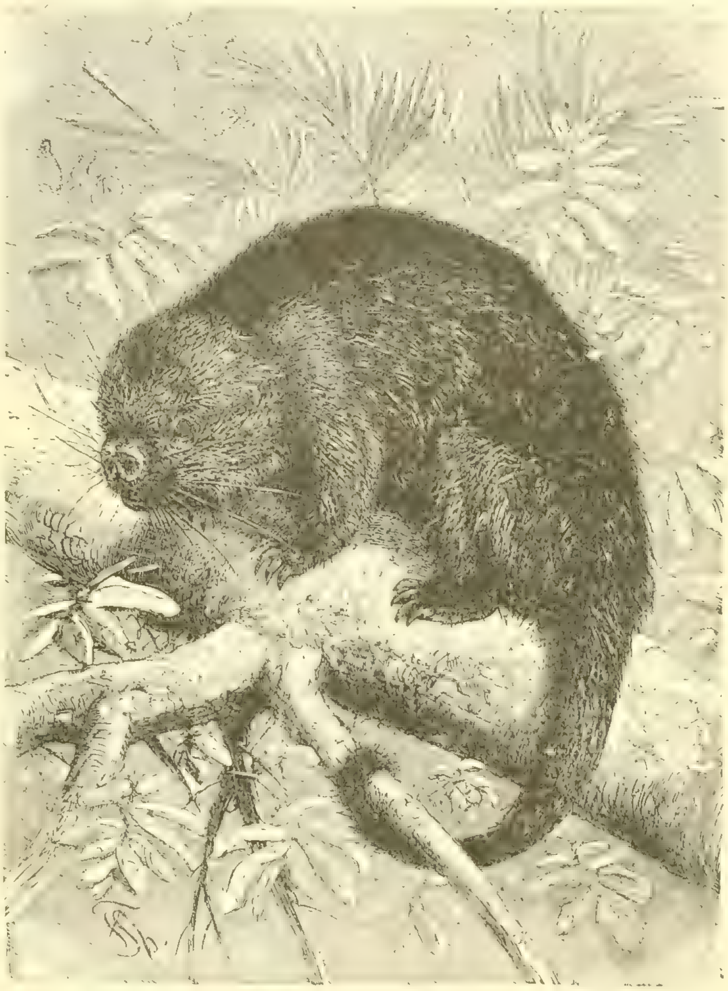
CANADIAN PORCUPINE, OR URSON.—*Erethizon dorsatum.*

The victorious Urson did not long survive the affray, for as the summer weather approached, it betrayed unmistakable signs of distress, and finally died of heat. A similar anecdote is recorded of an Urson, which took a sudden umbrage at the attentions of a person who was attempting to caress it, and unexpectedly dealt him such a blow with its tail that his offending right hand was instantly covered with wounds.

The Urson is not so fully defended with spines as the two preceding animals, but is covered with long, coarse, blackish-brown hair, among which the short pointed quills are so deeply set, that, except in the head, tail, and hinder quarters, they are scarcely perceptible. These spines are largely used by the American Indians in the decoration of their hunting-pouches, moccasins, and other articles, and after the quills are extracted, the remainder of the fur is sufficiently soft to be used for clothing. The flesh of the Urson is considered eatable, and is said to bear some resemblance to flabby pork.

The length of the Urson is not quite four feet, the head and body measuring rather more than three feet, and the tail about nine inches. The teeth are of a bright orange.

The Canada Porcupine is, probably, much less known than the African species, which is figured very commonly in books. It is known as Hedgehog in the country, but the true Hedgehog is an European species of animal, entirely different; belonging to another order, the Insectivora. The Canada Porcupine has been kept alive in Central Park. The tales concerning the *throwing* of the quills are fabulous. We had an opportunity to observe the manner of using the quills as means of defence. In the Park Collection was an adult Canada Porcupine, in a box with a small rabbit. Each animal kept as far from the other as possible, but in an unlucky moment the rabbit chanced to approach near the Porcupine, when in an instant the tail of the latter was struck against the rabbit, leaving hundreds of the smaller quills studding his face and shoulders. Like the African species, the larger and longer quills are for ornament; the weapons are the small ones massed just over the rump and base of tail. The motion is so quick it easily escapes notice, hence the uninformed observer is ready to believe that the quills are thrown out.



COENDOO, OR BRAZILIAN PORCUPINE.—*Cercolabes urchensilis.*

This animal was common in Massachusetts during the first half of this century. Its range is from Maine to Kentucky, but it is not seen on the sea-board. A Western variety reaches as far as Arizona and New Mexico. It is often seen in the albino state.

In Southern America, the Porcupines find a representative in the Coendoo, an animal which is not only remarkable for its array of quills, but also for the prehensile power of its long tail.

As might be presumed, from the prehensile tail and the peculiarly armed claws, the Coendoo is of arboreal habits, finding its food among the lofty branches of trees. On the level ground it is slow and awkward, but among the more congenial boughs it climbs with great ease, drawing itself from branch to branch by means of its hooked claws; but seldom using its tail, except as an aid in descent. The food of this animal consist of leaves, flowers, fruit, bark, and the soft woody substance of young and tender branches, which it slices easily with its chisel-edged incisor teeth. During the summer months the Coendoo becomes extremely fat, and its flesh is then in great request, being both delicate in flavor and tender in character. The young of this animal are born in the month of September or October, and are very few in number.

The total length of the Coendoo is about three feet six inches, of which the tail occupies one foot six inches. Its nose is thick and blunt, like that of the common Porcupine, and the face is furnished with very long whisker-hairs of a deep black. The numerous spines which cover the body are parti-colored, being black in the centre and white at each extremity. Their length is rather more than two inches on the back, an inch and a half on the fore-legs, and not quite an inch on the hinder limbs. A number of short quills are also set upon the basal half of the tail, the remainder of that organ being furnished with scales, and tapering to its extremity. The color of the scales is black. The entire under surface of the tail is covered with similar scales, among which are interspersed a number of bright chestnut hairs. The abdomen, breast, and inner face of the limbs are clothed with dense, brown, coarse hairs.

It is a nocturnal animal; sleeping by day, and feeding by night.

The two succeeding animals bear some resemblance to each other, but may be distinguished by the different shape of the head, and the structure of the feet and toes. These technical distinctions may be found in the list of generic differences which closes the first volume of this work. There are several species of Agoutis, the Common Agouti being considered as the type of the genus, and their habits being very similar.

The Agouti is a native of Brazil, Paraguay, Guiana, and other neighboring countries, but its numbers have been considerably thinned in many spots where cultivation has been industriously carried on. In some of the Antilles, where it formerly swarmed, it is now nearly extirpated, and in St. Domingo is but rarely seen. It is a voracious animal, eating almost every kind of vegetable food, having, however, an unfortunate preference for those plants which have been reared under human superintendence. It is especially fond of roots, such as potatoes and yams, and is so destructive among sugar-canes that the planters are forced to wage a war of extermination against the Agouti before they can hope for a good crop. Very few of these animals are to be found in any spot where the sugar-cane has been cultivated to any extent. Besides plants and nuts, the Agouti eats various fruits, displaying a strong predilection for nuts. Like many of the rodent animals, it is capable of varying its diet with animal substances, and will seldom refuse a piece of meat if offered.

AGOUTI.—*Dasyprocta aguti.*

It is a tolerably swift animal, as might be supposed from the great comparative length of its hinder limbs, but does not appear to be capable of sustaining a long chase. Open country is on that account rather distasteful to the Agouti, who prefers wooded districts, where it can find shelter without being forced to run for any considerable distance. When running, it bears some resemblance to the common hare, and, like that animal, is rather apt to overbalance itself when running down hill, and to roll for some yards before it can recover itself.

All its movements are sharp, quick, and active, and even while sitting upright and engaged in feeding itself by the assistance of its fore-paws, its head is continually being turned from side to side, and its bright eyes glance in every direction, in order to guard against a surprise. As it is a nocturnal animal, and spends the whole of the day in its dark hiding-place, its ravages take place under cover of night, and are the more difficult to be repelled. Its usual resting-place is in the cleft of a rock, or in the hollow of some decaying tree, where twenty or thirty of these animals may be found living amicably together.

In these dark recesses the young Agoutis are born, and are laid upon a soft bed of leaves, where they remain for a few weeks, and then sally out with their parents on their nocturnal expeditions. There are generally two broods in each year, and the number of young at a birth is from three to six.

The Agouti can be readily domesticated, but is in no great favor as a pet, because it is so fond of exercising its sharp teeth upon any article of furniture which may fall in its way, and will in a very few minutes cut its way through an ordinary wooden door. Moreover, it ill repays the trouble which has been taken in taming it, for it seems to lose all its amusing qualities when it is once placed in an enclosure and furnished with regular food. It appears hardly to be capable of distinguishing kindness from cruelty, and displays but little emotion at the presence of the person who brings its daily food. It is naturally a gentle creature, and when captured will not attempt to bite the hand that seizes it, but only gives vent to a piteous squeak as it feels itself made a prisoner. The flesh of the Agouti is white and good-flavored, and is thought to resemble a mixture of the hare and rabbit. In some countries which it inhabits it is commonly eaten, while in others a prejudice prevails against its use as an article of diet.

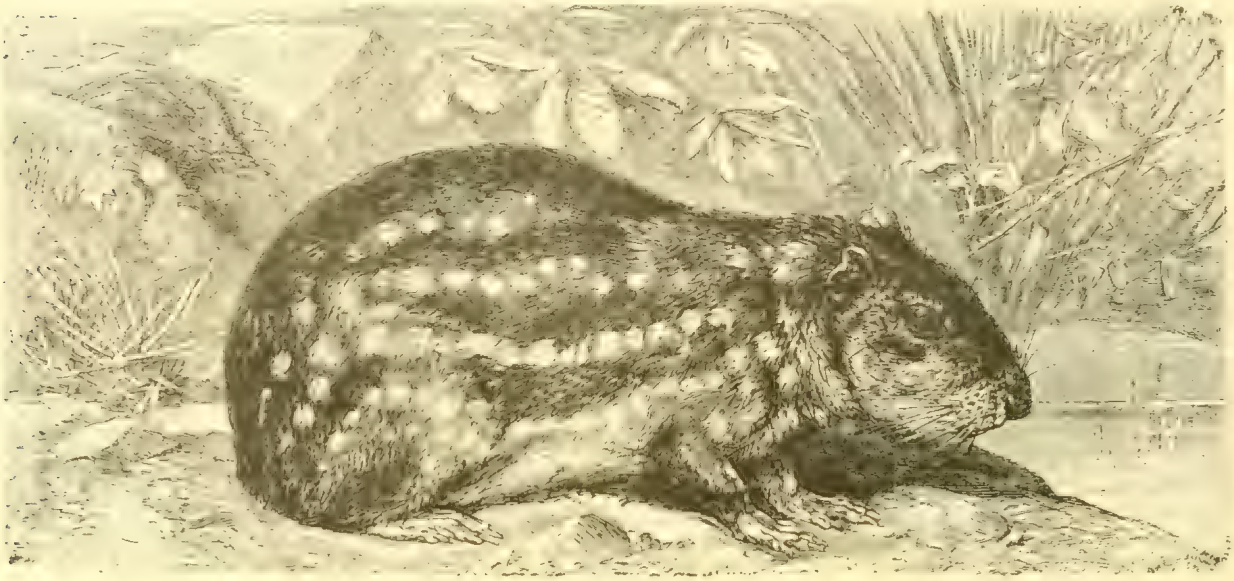
The name, Dasyprocta, which has been given to the genus, refers to the thick hair which falls over the hind quarters, and nearly conceals the little pointed stump of a tail. The hair of this part of the body is a bright golden-brown, but on the back and sides the fur has a curious speckled aspect, on account of the black, brown, and yellow tints with which each hair is marked. On the greater part of the body the fur is only about one inch in length, but the golden-brown hair of the hinder parts is more than four inches long. In character it is coarse, though glossy.

MARA.—*Dolichōtis patachōnica.*

Though all the species are furnished with powerful claws, the Agouti is incapable of climbing trees or digging burrows. It is said to have some idea of laying up provisions, and to hide any superabundance of food in some place of concealment. In size it equals the common rabbit, but does not equal the hare.

Between the agoutis and the pacas is placed the Mara, or Patagonian Cavy, as it is sometimes called, an animal which is remarkably swift for a short distance, but is so easily fatigued that it can be run down by a man on horseback. It is more tamable than the agouti, and is often kept in a state of domestication, being permitted to range the house and premises at will. It is generally found in couples, a male and his mate occupying the same "form." It does not seem to burrow, nor to keep so close to its retreat as the agouti, but is fond of crouching in a form like our common hare. It is about thirty inches in length, and about nineteen inches high at the crupper, which is the most elevated part of the animal. At the shoulder it hardly exceeds sixteen inches. The fur of this animal is soft and warm, and from the contrasting colors of black, white, and golden-brown, presents a very handsome appearance. Its scientific title is *Dolichótis patachónicus.*

The Pacas are remarkable for the extraordinary development of a portion of the skull, which gives to the entire head a very singular aspect. The cheekbone is enormously developed into a large, expanded mass of bone, concave and very rough on the exterior, and smooth and concave interiorly. This enlarged bone is so enormous that its lower edge descends below the lower jawbone, and hides a considerable portion of it. Closely connected with this curious structure is a cheek-pouch, for which no use has hitherto been discovered. There are also two large cheek-pouches which open into the mouth, and extend past the jaws into the neck. In consequence of this formation, the name of Cœlógenys, or "Hollow-cheek," has been given to this genus.



DUSKY PACA.—*Cœlógenys paca.*

The Pacas inhabit Southern America, being mostly, if not entirely, restricted to the eastern portions of that country, and have also been found in some of the West Indian islands.

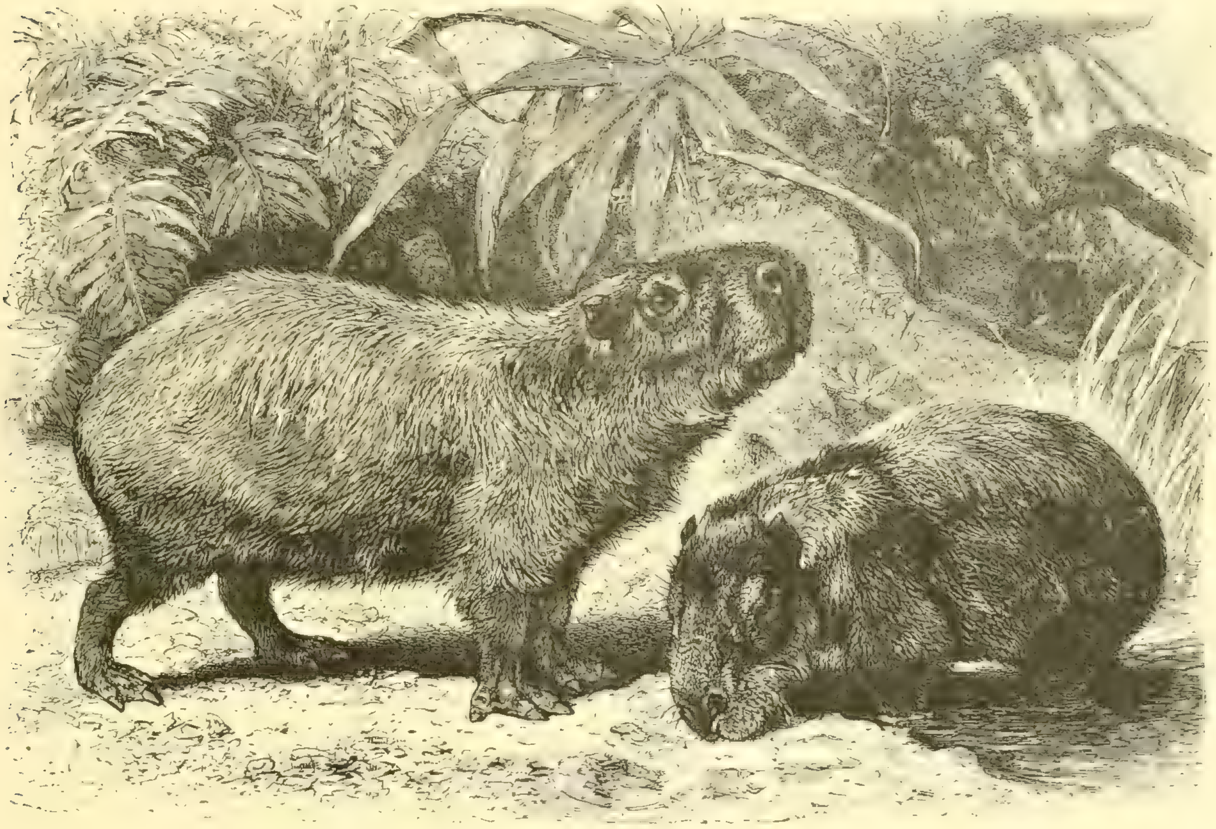
The Dusky Paca is really a pretty animal, the rows of white spots which decorate its sides standing out in pleasing contrast to the rich black-brown hue with which the remainder of the fur is tinged. The throat and abdomen are white, and the lowermost of the four rows of white spots is often nearly merged into the white fur of the under portions of the body. The coloring is rather variable in different individuals. The paws are light flesh-color, and the large full eyes are dark brown. The total length of this animal is about two feet.

In its native land it is quite as destructive as the agouti, and, like that animal, is a terrible foe to the sugar-canes, which are too frequently destroyed in great quantities by the nocturnal visits of the Paca. The aggrieved planters retaliate by making diurnal attacks on the Paca burrows when they know the animal will be at home; and by stopping up two of the three entrances which lead to the secret chamber of the midnight robber, are enabled to dislodge the hidden animal from its retreat. When hard pressed, the Paca turns fiercely on its assailant. and fights desperately in defence of itself and its home.

It is an active animal, in spite of its clumsy looks, and not only runs with considerable speed, but is a good swimmer, and can jump well.

The favorite localities of the Pacas are in wooded districts, in marshy grounds, or near the banks of rivers. Their domiciles are excavated in the ground, but are at no great depth, and are remarkable for the admirable state of cleanliness in which they are preserved by the inhabitants. The burrows are often so shallow that their roofs cannot support any superincumbent weight, and will give way under the tread of man or horse.

When properly dressed by being scalded and roasted, the flesh of the Paca is much esteemed, although it is too rich and fat to please the palates of some persons. The fur is of little value, being short and harsh, so that the skin of the Paca is useless until it has been deprived of hair and tanned. The Paca is only moderately intelligent; and when in captivity appears, like the agouti, to lose a great portion of the bright intelligence which characterizes its wild nature. It appears to take great care of its fur, and is as fastidious in its toilet as the domestic cat, washing itself in the same manner, and combing itself carefully with the claws of its hind and fore feet.



CAPYBARA.—*Hydrochœrus capybara.*

Few persons, on seeing a Capybara for the first time, would be inclined to class it with the animals to which it is so nearly related. The great size, the harsh, coarse hair, more like the bristles of a hog than the soft, delicate fur which clothes the generality of rodent animals, the hoof-like toes, and the heavy, clumsy bearing of the animal, are so swinish in appearance that any ordinary spectator might well imagine that he saw before him a very curious example of the wild-hogs. In allusion to the external resemblance which this animal bears to the swine, it has received the name of Hydrochœrus, or Water Hog. It is a native of Southern America, and has a rather wide range.

The Capybara is the largest of all the living rodent animals, rather exceeding three feet in total length, and being so bulkily made that when it walks its abdomen nearly touches the ground. The muzzle of this animal is heavy and blunt, the eyes are set high in the head, and are moderate in size, the tail is wanting, and the toes are partially connected together by a development of the skin. The color of the Capybara is rather indeterminate, owing to the manner in which the hairs are marked with black and yellow, so that the general idea which its coat presents is a dingy, blackish-gray, with a tinge of yellow. The hairs are rather long, and fall heavily over the body. The incisor teeth are of enormous dimensions, and the molars are very curiously formed, presenting some analogy to those of the elephant.

It is a water-loving animal, using its webbed feet with great power, and fleeing instinctively to the stream when terrified by real or imaginary danger. It not only swims well, but is a good diver; and when endeavoring to escape from a foe, always tries to evade its pursuer by diving as long as its breath will hold out, and only permitting the top of its head to appear above the surface when it rises for the purpose of respiration. As, however, it can remain under water for a space of eight or ten minutes, it finds no difficulty in escaping from any ordinary foe, if it can only gain the shelter of the welcome stream. The food of this animal is exclusively vegetable, and its curious teeth are needed in order to bruise the herbage on which it feeds into a mass sufficiently pulpy to enable it to pass through the very narrow throat.

The Capybara is a gregarious creature, being generally found in small herds upon the banks of the streams which they frequent. These animals are subject to considerable persecution at the hand of man and beast, as the flesh is remarkably good, and when properly treated can be preserved like ham or bacon. The jaguar preys largely on the Capybara, which is so large and fat that it affords a plentiful and succulent meal; and is so easily overcome that the jaguar finds no difficulty in supplying himself with a dinner. There is a kind of musky flavor about the flesh of the Capybara which is very attractive to some persons, but is equally repulsive to others. When startled, it utters a peculiar sound, something between a bark and grunt, in which an indefinite noise is produced, and a large amount of breath expended.

GUINEA PIG.—*Cavia aperea.*

THE Cavies are well represented by the common GUINEA PIG.

Few animals have received less appropriate names than the Guinea Pig; for it is not a pig, but a rodent, and does not come from Guinea, but from Southern America. It is very easily tamed; for its disposition is so unimpressible and dull that it accommodates itself to change of locality without betraying any emotion, and seems hardly to be susceptible even of fear. Being a very pretty little creature, it is in some favor as a domestic pet; and as it is remarkably prolific, it very rapidly increases in numbers, if it is well defended from cold and preserved from damp, as without warmth and a dry habitation it soon dies. The food of the Guinea Pig is exclusively of a vegetable nature, and while feeding it generally sits on its hinder feet, and carries the food to its mouth with its fore-paws.

An idea of the extreme fecundity of this animal may be formed from the fact that it begins to breed at ten months of age, that each brood consists on an average of six or eight, and that in less than three weeks after the birth of the young family they are driven to shift for themselves, and the mother is then ready for another brood. The young Guinea Pigs are born with their eyes open, and covered with hair, and do not attain their full dimensions until they have reached the age of eight or nine months.

The color of the Guinea Pig is very variable; but is generally composed of white, red, and black, in patches of different size and shape in each individual. The bare portions of the skin are flesh-colored, and the eye is brown. The animal is of little direct use to mankind, as its flesh is held in very low estimation, and its hair is so slightly attached to the skin that its coat is useless to the furrier. There was formerly a prevalent idea that rats had an especial antipathy to the Guinea Pig, and would not haunt any place where one of these animals was kept. Rabbit owners were therefore in the habit of placing a Guinea Pig in the same apartment with the hutches, in hopes of scaring away the rats, which are the chief enemies of tame rabbits. As, however, in several instances the Guinea Pigs were eaten by the rats instead of driving them from the premises, the custom has gradually fallen into deserved disrepute.

The group of animals which is known by the name of Leporidæ, from the Latin word, *lepus*, a hare, is easily distinguishable from the other rodents by the peculiar dentition of the upper jaw. Usually there are only two incisor teeth in that jaw; but in the Leporidæ there are four incisors, a pair of smaller teeth being placed immediately behind the usual upper incisors.

The common Hare is known from the rabbit by the redder hue of its fur, the great proportionate length of its black-tipped ears, which are nearly an inch longer than the head; by its very long hind legs, and its large and prominent eyes. When full-grown it is of considerable size, weighing on the average about eight or nine pounds, and sometimes attaining the weight of twelve or even thirteen pounds. In total length it rather exceeds two feet, the tail being about three inches long. The color of the common Hare is grayish-brown on the upper portions of the body, mixed with a dash of yellow; the abdomen is white, and the neck and breast are yellowish-white. The tail is black on the upper surface and white underneath, so that when the creature runs it exhibits the white tail at every leap. Sometimes the color of the Hare deepens into black, and there are many examples of albino specimens of this animal.

It is popularly supposed to be a timid animal, and has therefore received the specific title of "timidus;" but it is really possessed of no small share of courage. According to a well-known writer—not a sportsman—we malign the poor creature by stigmatizing it as cowardly or timid, because it runs away when it is hunted. Half a hundred horsemen, together with a pack of dogs, band together in pursuit of one defenceless Hare, which is likely to run away under such circumstances. There is hardly any animal, from an elephant or lion downwards, that would not run away in like manner; and it is very unfair to brand the poor Hare with an offensive epithet because it does not attempt to fight a field of horsemen and a pack of hounds.

However disposed the Hare may be to flight, when matched against such overwhelming odds, she is really a courageous animal when more fairly dealt with.

A countrymen had captured a young leveret in a furrow, and was proceeding to mark it by notching its ears, when he was interrupted in his work by the mother Hare, which flew at him with singular courage, and struck so fiercely with her feet that she tore his hands rather severely. Finding that she could not release her child, she stood within a few feet of the captor, and waited patiently until he liberated the little Hare, with which she went off. The Hare is a very pugnacious animal, and is in the habit of waging the most savage fights with those of its own species.

The very long and powerful hind legs of the Hare enable it to make prodigious bounds, and to cover a considerable space of ground at every leap. The hinder limbs are, indeed, of such great proportionate length that the animal does not walk, but proceeds by a series of hops or leaps. The Hare is so constituted that it never becomes fat, however rich and fertile may be the pasture in which it feeds, and is therefore enabled to run for a very great distance without being fatigued, as would be the case if its muscles were loaded with fat. It can also leap to a considerable height, and has been known to jump over a perpendicular wall of eight feet in height in order to escape from its pursuers.

It is a wonderfully cunning animal, and is said by many who have closely studied its habits to surpass the fox in ready ingenuity. Appearing to understand the method by which the hounds are enabled to track its footsteps, it employs the most crafty manœuvres for the purpose of throwing them off the scent. Sometimes it will run forwards for a considerable distance, and then, after returning for a few hundred yards on the same track, will make a great leap at right angles to its former course, and lie quietly hidden while the hounds run past its spot of concealment. It then jumps back again to its track, and steals quietly out of sight in one direction, while the hounds are going in the other.

The Hare also displays great ingenuity in running over the kind of soil that will best suit the formation of her feet, and be most disadvantageous to her pursuers, and has been known, on more than one occasion, to break the line of scent most effectually by leaping into some stream or lake, and swimming for a considerable distance before she takes to the land again. A Hare has been seen to brave the salt waters and tossing waves of the sea when closely pressed by the hounds, and to evade them by its bold ingenuity. Sometimes an old crafty Hare will baffle the hounds for a succession of seasons, until it is as familiar to the hunters as any of the dogs or horses, and makes the hounds so ashamed of their failures that they cannot be induced to chase it with any good will.

HARE.—*Lepus timidus.*

As may be supposed from the fact of its taking the water, the Hare is a good swimmer, and can sustain itself upon the surface for no inconsiderable time. One of these animals was seen to swim to an island which was at least a mile distant from the main land, and to perform its task right bravely. The clever animal actually waited upon the shore until slack water, when the tide is not running, and having ascertained this fact by frequently examining the rippling waves as they came curling over the beach, launched itself boldly upon the water, and swam rapidly to the nearest point of land.

Although possessed of a remarkably delicate sense of hearing, and furnished with very quick eyesight, the Hare seems to employ those senses upon objects which are behind her rather than on those in her front. On more than one occasion a Hare has been known to swerve in her course, and to run into the very midst of the hounds without having either seen or heard them.

The Hare does not live in burrows, like the rabbit, but only makes a slight depression in the ground, in which she lies so flatly pressed to the earth that she can hardly be distinguished from the soil and dried herbage among which she has taken up her temporary abode. Although she has no definite home, the Hare is strongly attached to her "form," wherever it may be placed, and even if driven to a great distance by the hounds, contrives to regain her little domicile at the earliest opportunity. As the varying seasons of the year bring on their varied accompaniments of heat and cold, rain and drought, or clouds and sunshine, the Hare changes the locality of her "form," so as to be equally defended against the bitter frost and snows of winter, or the blazing rays of the noontide summer sun.

The common Hare is not found in Ireland, but the Irish Hare, *Lepus hibérnicus*, is extremely common in that country, and takes the place of the common *Lepus timidus.* It may be distinguished from its English relation by its shorter limbs, its round head, and short ears, which are not so long as the head. According to some writers, the Irish Hare is identical with the Alpine Hare, and ought to be ranked with that animal, under the title of *Lepus variábilis,* or Variable Hare, in reference to the annual blanching of its coat during the winter months.

ALPINE HARE.—*Lepus variábilis.*

The Rabbit family (*Leporidæ*) is represented in both North and South America, but is far more numerous in the temperate portions of North America.

One species only reaches the Arctic zone—the Polar Hare—which also ranges around the globe within the circle. *Lepus braziliensis* is the only species found in South America, which ranges from Patagonia to Central America.

The great interior plains, or prairies, of North America afford numerous species. Four are enumerated.

The Hares are regarded as forming one of the best defined groups among mammals.

The Prairie Hare (*Lepus campestris*) is one of the kinds discovered early by Lewis and Clark, on the first opening of the great interior prairies. It is not known eastward of Fort Riley, in Kansas. It is about twenty inches in length. Its winter coat is white, with some rusty marks. In summer its coat is a yellowish-gray. In the Great Salt Lake Valley it is abundant.

The Northern Varying Hare (*Lepus americanus*) is about the same size as the preceding. It is the most familiar and common variety known to our markets in winter. Several varieties are found in different parts of North America. In winter it is white, with its ear-tips bordered with black. In summer it is brown, varied with black.

The Wood Hare (*Lepus sylvaticus*) is represented by three varieties. The term Gray Rabbit is very commonly used to designate the three. This species is smaller than the preceding.

Its *habitat* ranges from Hudson's Bay to Florida. It is timid and inoffensive. It does not burrow, but makes a "form," a slight depression on the ground sheltered by some shrub. It breeds about three times in a season, producing four to six at a birth. Its general form and habits are much like those of the English rabbit.

Trowbridge's Hare (*Lepus trowbridgii*) is the smallest of the family. Its *habitat* is on the Pacific coast. Six other species are known to North America: found in California and Texas.

RABBIT.—*Lepus suniculus.*

An interesting animal is the North American Pika (*Lagomys princeps*), known as the Little Chief Hare. It was once regarded as allied to the Hares; now, it forms a family by itself. It is quite small—but little larger than a common Norway rat. Its range is from the tops of the Rocky Mountains to British America. Though not properly a Hare, it strongly resembles a young English rabbit.

Resembling the hare in general appearance and in many of its habits, the Rabbit is readily distinguished from that animal by its smaller dimensions, its different color, its shorter and uniformly brown ears, and its shorter limbs.

The Rabbit is one of the most familiar of quadrupeds, having taken firm possession of the soil into which it has been imported, and multiplied to so great an extent that its numbers can hardly be kept within proper bounds without annual and wholesale massacres. As it is more tamable than the hare, it has long been ranked among the chief of domestic pets, and has been so modified by careful management that it has developed itself into many permanent varieties, which would be considered as different species by one who saw them for the first time. The little, brown, short-furred, wild Rabbit of the warren bears hardly less resemblance to the long-haired, silken-furred Angola variety, than the Angola to the pure lop-eared variety with its enormously lengthened ears and heavy dewlap.

In its wild state the Rabbit is an intelligent and amusing creature, full of odd little tricks, and given to playing the most ludicrous antics as it gambols about the warren in all the unrestrained joyousness of habitual freedom.

To see Rabbits at their best, it is necessary to be closely concealed in their immediate vicinity, and to watch them in the early morning or at the fall of evening. No one can form any true conception of the Rabbit nature until he has observed the little creatures in their native home; and when he has once done so, he will seize the earliest opportunity of resuming his acquaintance with the droll little creatures.

To describe the manifold antics of a Rabbit warren would occupy the space which ought to be devoted to some twenty or thirty animals, and even then would be quite inadequate to the proposed task. They are such odd, quaint, ludicrous beings, and are full of such comical little coquetries and such absurd airs of assumed dignity, that they sorely try the gravity of the concealed observer, and sometimes cause him to burst into irrepressible laughter, to their profound dismay.

At one time they are gravely pattering about the doors of their subterranean homes, occasionally sitting upright and gazing in every direction, as if fearful of a surprise, and all behaving with the supremest gravity. Next moment, some one gets angry, and stamps his feet fiercely on the ground as a preliminary observation before engaging in a regular fight. Suddenly a whole party rush off at full speed, scampering over the ground as if they meant to run for a mile at least, but unexpectedly stop short at an inviting tuft of herbage, and nibble it composedly as if they had not run a yard. Then a sudden panic will flash through the whole party, and with a rush and a scurry every rabbit leaps into its burrow and vanishes from sight like magic. The spot that was so full of life but a moment since is now deserted and silent as if it had been uninhabited for ages; but in a few minutes one little nose is seen cautiously poked out of a burrow, the head and ears follow, and in a very few minutes the frightened Rabbits have come again into the light of day, and have recommenced their interrupted pastimes.

Few animals are so easily startled as the Rabbit, and with perfect good reason. For their enemies are found in so many directions and under such insidious guises, that they are well justified in taking every possible precaution for their safety. Sundry rapacious birds are very fond of young Rabbits, and sweep down unexpectedly from some unknown aërial region before the doomed creature can even comprehend its danger. Stoats and weasels make dreadful havoc in a warren, and even the domestic cat is sadly apt to turn poacher if a well-stocked warren should happen to be within easy distance of her home. Foxes are very crafty in the pursuit of young Rabbits, and dig them out of the ground in a very ingenious and expeditious manner; while the common hedgehog is but too apt to indulge its carnivorous appetite with an occasional Rabbit.

The burrows in which the Rabbit lives are extremely irregular in their construction, and often communicate with each other to a remarkable extent.

From many of its foes the Rabbit escapes by diving suddenly into its burrow; but there are some animals, such as the stoat, weasel, and ferret, which follow it into its subterranean abode, and slay it within the precincts of its own home. Dogs, especially those of the small terrier breeds, will often force their way into the Rabbit burrows, and have sometimes paid the penalty of their lives for their boldness. The Rabbit has been seen to watch a terrier dog safely into one of the burrows, and then to fill up the entrance so effectually that the invader has not been able to retrace his steps, and has perished miserably beneath the surface of the ground.

When the female Rabbit is about to become a mother, she quits the ordinary burrows, and digs a special tunnel for the purpose of sheltering her young family during their first few weeks of life. At the extremity of the burrow she places a large quantity of dried herbage, intermixed with down which she plucks from her own body, so as to make a soft and warm bed for the expected occupants. The young Rabbits are about seven or eight in number, and are born without hair and with their eyes closed. Not until they have attained the age of ten or twelve days are they able to open their eyelids and to see the world into which they have been brought.

When domesticated, the female Rabbit is sometimes apt to eat her own young, a practice which has been considered as incurable. It seems, however, that the Rabbit acts in this apparently unnatural manner from very natural causes. It has long been the custom to deprive Rabbits of water, on the plea that in a wild state they never drink, but obtain the needful moisture from the green herbage on which they feed. But in the open country they always feed while the dew lies heavily upon every blade, which is never the case with the green food with which the Rabbits are supplied.

Rabbits are fed very largely on bran, oats, and other dry nourishment which they do not obtain in their normal state of freedom. The mother Rabbit instinctively licks her young when they are born, and is evidently liable to an exceeding desire for liquid nourishment which prompts her to eat anything that may assuage her burning thirst. A Rabbit, which had already killed and begun to eat one of her offspring, has been seen to leave the half-eaten body and to run eagerly to a pan of water which was placed in her hutch. It may easily be supposed that when an animal is obliged to afford a constant supply of liquid nourishment to her young, she is forced to imbibe a sufficiency of fluid to enable her to comply with the ever recurring demands of her offspring.

Rabbits are terribly destructive animals, as is too well known to all residents near a warren, and are sad depredators in field, garden, and plantation, destroying in very wantonness hundreds of plants which they do not care to eat. They do very great damage to young trees, delighting in stripping them of the tender bark as far as they can reach while standing on their hind feet. Sometimes they eat the bark, but in many cases they leave it in heaps upon the ground, having chiselled it from the tree on which it grew, and to which it afforded nourishment, merely for the sake of exercising their teeth and keeping them in proper order, just as a cat delights in clawing the legs of chairs and tables.

When the Rabbits have begun to devastate a plantation, they will continue their destructive amusement until they have killed every tree in the place, unless they are effectually checked. There are only two methods of saving the trees—one of killing all the Rabbits, and the other by making them disgusted with their employment. The latter plan is generally the most feasible, and can be attained by painting each tree with a strong infusion of tobacco, mixed with a sufficiency of clay and other substances to make it adhere to the bark. This mixture should be copiously applied to the first three feet of every tree, so that the Rabbit cannot find any portion of the bark that is not impregnated with the nauseous compound, and is an effectual preservative against their attacks.

In their normal state of freedom, Rabbits feed exclusively on vegetable food, but in domestication they will eat a very great variety of substances. Many of my own Rabbits were very fond of sweetmeats, and would nibble a piece of hardbake with great enjoyment, though they were always much discomposed by the adhesive nature of their strange diet, and used to shake their heads violently from side to side when they found themselves unable to disengage their teeth. They would also eat tallow candles, a fact which I discovered accidentally, by seeing them devour a candle-end that had fallen out of an old lantern. These curious predilections were the more unaccountable, because the animals were most liberally supplied with food, and were also permitted to run in the kitchen garden for a limited time daily, and to feed upon the growing lettuces, parsley, carrots, and other vegetables, as they pleased.

As a general fact, the Rabbit has a great antipathy to the hare, so that the two animals are seldom, if ever, seen in close proximity. The possibility of a hybrid progeny between the two species was, until late years, entirely denied. There are, however, several accidental instances of such a phenomenon, and in every case the father has been a Rabbit and the mother a hare. There are many examples of young Rabbits which possess much of the coloring and general aspect of the hare, but these are almost invariably the offspring of domesticated Rabbits which have been turned into a warren.

In its native state, the fur of the Rabbit is of nearly uniform brown, but when the animal is domesticated, its coat assumes a variety of hues, such as pure white, jetty black, pied, dun, slaty-gray, and many other tints.

The Chinchilla, so well known for its exquisitely soft and delicate fur, belongs to the group of animals which are known to zoologists under the title of Jerbódiæ, and which are remarkable for the great comparative length of their hinder limbs, and their long, hair-clothed tails.

The Chinchilla is an inhabitant of Southern America, living chiefly among the higher mountainous districts, where its thick silken fur is of infinite service in protecting it from the cold. It is a burrowing animal, digging its subterranean homes in the valleys which intersect the hilly country in which it lives, and banding together in great numbers in certain favored localities. The food of the Chinchilla is exclusively of a vegetable nature, and consists chiefly of various bulbous roots, which it disinters by means of its powerful fossorial paws. While feeding, it sits upon its hinder feet, and conveys the food to its mouth with its fore-feet, which it uses with singular adroitness. It is a most exquisitely cleanly animal, as might be supposed from the beautiful delicacy of its fur, for we may always remark, that whenever an animal is remarkable for the coloring or the texture of its natural robes, it is always most assiduous in preserving them from any substance that might stain their purity or clog their fibres.

The fur of the Chinchilla is of a delicate, clear gray upon the back, softening into a grayish-white on the under portions, and its texture is marvellously soft and fine. As the fur seems to be of two different qualities in animals that are brought from different parts of South America, it is supposed that there may be either two distinct species of this animal, or at least two permanent varieties, the hair of one being very much more delicate than that of the other. Besides being dressed and employed as a fur, the hair of the Chinchilla is so long and soft that it is well adapted for the loom, and has been manufactured into various fabrics where warmth and lightness are equally required.

As the animal is very small, only measuring fourteen or fifteen inches in total length, the tail occupying nearly one-third of the measurement, many skins are employed in the manufacture of one article of ordinary dress, and the destruction of the Chinchilla is necessarily very considerable in order to supply the constant demand for this deservedly popular fur.

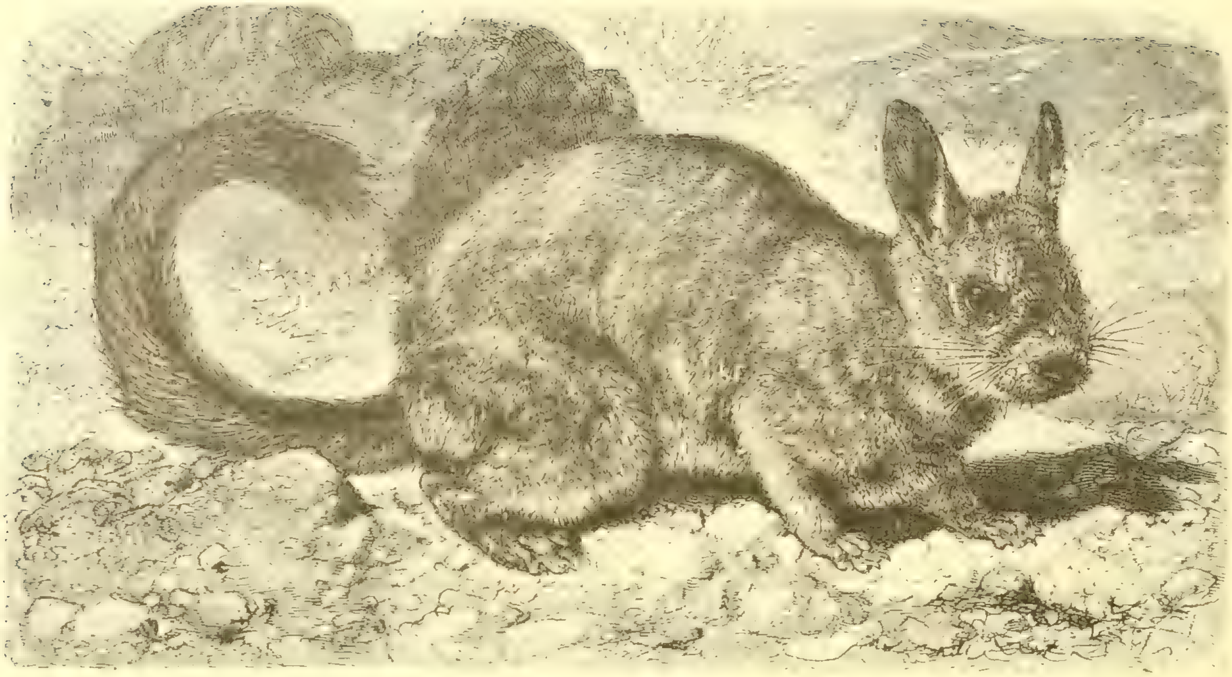
CHINCHILLA.—*Chinchilla laniger.*

As far as is known, the Chinchilla is not a very intelligent animal, seeming to be hardly superior to the Guinea pig in intellect, and appearing scarcely to recognize even the hand that supplies it with food.

The Lagotis is distinguishable from the preceding animal by the structure of the fore-feet, which are only furnished with four toes, while those of the chinchilla possess five. The ears are very long in proportion to the head, and being somewhat similar to those of the hare, have gained for the animal the generic name of Lagotis, or Hare-eared.

The hinder limbs are long, and very much resemble those of the hare or rabbit; and the whole aspect of the creature partakes greatly of the leporine character. The coat is very like that of the hare in color and texture, and is soft, long, and rather woolly, but as it is only slightly attached to the skin, is valueless as a fur. The long ears are rounded at their extremities, and their margins are rolled inwards. The tail is so long that it forms a ready means of separating the Lagotis from the hares or rabbits, being quite as long as the body, and thickly covered with stiff hairs.

It is an inhabitant of Peru, and takes up its residence in the crevices of the rocky localities among which it dwells. Although tolerably active, it appears to be possessed of little endurance, never attempting to escape by speed if it should chance to be alarmed, but diving at once into the welcome shelter of the nearest cranny. When wounded, they always seek the same retreat, so that unless they are killed by some instantly mortal injury, their bodies cannot be recovered by the hunter. The fur of this animal is so slightly attached to the skin that it comes away when handled. The flesh, however, is delicate and tender, and it is chiefly for the sake of its value as an article of food that the Lagotis is hunted.



LAGOTIS.—*Lagotis cuvieri.*

The Gerboas bear a curious resemblance to the kangaroos, not only in their general appearance, but in many of their habits. Like those animals, they leap over distances which are absolutely enormous when the size of their bodies is taken into consideration, they constantly sit upright in order to observe surrounding objects, their food is of the same nature, and they carry it to their mouths in a similar manner. Their fore-limbs are extremely short, while the hinder legs and feet are developed to a very great extent, and they are all furnished with a long, hair-clad tail, which serves to aid them in preserving their balance while shooting through the air.

One of the most familiar of these leaping rodents is the Spring Haas, or Cape Gerboa, sometimes called, from its hare-like aspect, the Cape Leaping Hare.

It is a native of Southern Africa, and is found in considerable numbers upon the sides of mountains, where it inhabits certain burrows which it tunnels for itself in the ground. It prefers sandy ground for the locality of its habitation, and associates together in great profusion in favorable spots, so that the earth is completely honeycombed with its burrows. Being a nocturnal animal, it is rarely seen by daylight, seldom leaving its stronghold as long as the sun is above the horizon. The natives, who set some value on its flesh, take advantage of this habit, and being sure of finding the Spring Haas at home during the daytime, take their measures accordingly. Placing a sentinel at the mouth of the burrow, they force the inmate to evacuate the premises by pouring a deluge of water into the hole, and as it rushes into the open air, it is seized or struck down by the ready hand of the sentinel.

Like the kangaroos, the Spring Haas prefers rough and rocky ground to a smooth soil, and displays such wonderful agility as it leaps from spot to spot, that it can baffle almost any foe by its mere power of jumping. At a single leap this creature will compass a space of twenty or thirty feet, and is able to continue these extraordinary bounds for a great distance. It is rather a mischievous animal, as, like the common hare, it is in the habit of making nocturnal raids upon the corn-fields and gardens, and escaping safely to its subterranean burrow before the sunrise.

With the exception of shorter ears, and the elongated hinder limbs, the Spring Haas is not unlike our common hare. The fur is of a dark fawn, or reddish-brown, perceptibly tinged with yellow on the upper parts, and fading into grayish-white beneath. In texture it is very similar to that of the hare. The tail is about as long as the body, and is heavily covered with rather stiff hairs, which at the extremity are of a deep black hue. Upon the

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SPRING HAAS.—*Pedetes caffer.*

fore legs there are five toes, which are armed with powerful claws, by means of which the animal digs its burrows, while the hinder feet are only furnished with four toes, each of which is tipped with a long and rather sharply pointed claw.

THE Jerbóidæ find their best type in the common GERBOA of Northern Africa.

This beautiful and active little animal is hardly larger than an ordinary English rat, although its peculiar attitudes and its extremely long tail give it an appearance of greater dimensions than it really possesses. The general color of its fur is a light dun, washed with yellow, the abdomen being nearly white. The tail is of very great proportionate length, is cylindrical in shape, and tufted at its extremity with stiff black hairs, the extreme tip being white. From various experiments that have been made upon this member and its use to the animal, it appears that the tail is of infinite service in preserving the proper balance of the body while the creature is flying through mid-air in its extraordinary leaps; for in proportion as the tail was shortened, the power of leaping diminished, and when it was entirely removed, the animal was afraid to leap at all. Such truncated specimens were almost deprived of all power of locomotion, for they could never preserve their balance as they rose upon their hinder feet, but rolled over on their backs. As the Gerboa rises from one of its huge bounds for the purpose of commencing a second leap, it curves its tail into the peculiar form which is represented in the engraving, but straightens it in its aërial course.

The Gerboa is a burrowing animal, and lives in society, so that it forms large natural "warrens" in those parts of the country where it takes up its residence. It is much hunted by the natives, who set some store by its rather unpalatable flesh, and is captured by stopping up as many burrows as can conveniently be reached, and killing the Gerboas as they rush affrighted from the open entrances. This is, indeed, almost the only successful mode of capturing these fleet and agile creatures; for if they can once leap away from the immediate vicinity of their pursuers, they scour over the ground with such wonderful speed that they can hardly be overtaken even by a trained greyhound.

Dry and sandy spots are in greatest favor with the Gerboa, which is better able to dig in such soils than in moist situations. Against the injurious effects of the hard and burning ground upon its feet it is guarded by a thick covering of stiff, bristly hairs, which defend the soles of the feet from injury, and, moreover, are useful in giving a firm hold upon the ground when the animal is in the act of making one of its extraordinary bounds. It is a lively and playful animal, delighting to bask itself in the sun near the entrance of its burrows, and to divert itself by occasional gambols with its companions. Although it makes these visits to the open air for the sake of enjoying the warm beams of the sun, the Gerboa is a nocturnal animal, and feeds only by night.

GERBOA.—*Dipus ægyptius.*

By the united powers of its teeth and claws it can drive its tunnel through impediments which would baffle any ordinary animal; for it can not only cut its way through the hardest sand, but is even able to gnaw a passage through the thin layer of stone which lies beneath the sand. The food of these animals consists chiefly of roots and similar substances, which it digs out of the earth, but it also feeds on various kinds of grain.

The generic term "Dipus," or two-footed, has been given to the true Gerboas because they press their fore-feet so closely to their breasts while they leap that they appear to be entirely destitute of those limbs, and only to possess the two long hind legs. All the animals that belong to this genus have five toes on their fore-feet and only three on the hinder feet. The hair of the tail is arranged in a double row, after the manner which is scientifically called "distichous."

THERE are many species of Jerboidæ inhabiting different countries, all of which are very similar in shape and habits. Among these may be noticed the ALACTAGA, or Jumping Rabbit of Siberia, and the GERBILLES of Africa and India.

THE family Zapodidæ embraces those little forms called Jumping Mice. It is represented by a single species, the Jumping Mouse; Deer Mouse (*Zapus hudsonicus*). This odd little creature was first brought to notice by Pennant during his extended Northern tour. According to De Kay it is "numerous in all parts of New York State." The Indians call it *Wah-peh-sous*, or the animal that jumps like a deer. It is said to leap ten or twelve feet at a bound. It produces four young at a birth, and three litters in a year. The little creatures are sometimes turned out of their homes during the haying time, and a common sight is that of the mother with four little ones hanging to her teats.

NEXT in order to the Gerboas is placed the small group of animals which are sufficiently familiar by the name of Dormice. This term signifies "Sleepy Mouse," and is most appropriate to the lethargic little creatures, which spend the greater part of their time in somnolency. One of these animals, the LOIRE, or FAT DORMOUSE, is celebrated in classical literature as being in great request among the luxurious Romans as an article of diet. For this purpose the Loire was carefully fattened, being placed in certain receptacles, which were called Gliraria, from the Latin word *glis*, which signifies a dormouse. The Loire is found in almost all the warmer portions of Europe, but is seldom seen at any great elevation above the level of the sea.

THE LEROT, or GARDEN DORMOUSE, inhabits the same localities as the Loire, but its flesh is not eatable like that of the Fat Dormouse, although it resembles it very nearly in every point but size.

The total length of this animal is rather more than eight inches, of which measurement the tail occupies three inches. The general color of its fur is gray, deeply tinged with red upon the back, and becoming white upon the abdomen. Below the eye is a patch of black fur, which extends nearly to the ears. The tail of the Lerot is covered with short black hair, changing rather abruptly into white at its extremity. It has derived its title of Garden Dormouse from its annoying habit of entering gardens and making sad havoc of the choicest fruit; for it is an animal of great taste, and makes its selection among the ripest and best fruits with an accuracy of judgment that may be highly agreeable to itself, but is sincerely execrated by the owner of the garden. It is particularly fond of espalier-trained fruit-trees, and is much given to devouring the peaches when they are just in their bloom of rosy perfection.

The Lerot is not content with making these autumnal raids upon the gardens, but is sufficiently provident to lay up a store of food for the winter, and for that purpose to carry off corn, peas, and beans in no small quantity. Its winter nest is made in some convenient recess, where six or eight Lerots congregate, and pass the cold wintry months in a slumber which is almost unbroken, except by the needful occasional wakings for the purpose of taking food. In summer time it makes a temporary nest in hollow trees, holes in old walls, or in similar localities, and reposes during the daytime upon a bed of dried grass and leaves. Sometimes it is so bold that it will make its way into human habitations, and establish itself in the very home of the justly incensed owner of the garden.

LOIRE, OR FAT DORMOUSE.—*Myorus glis.*

The young Lerots enter upon their existence in the middle of summer, and grow with wonderful rapidity. They do not, however, become parents in their turn until the following year. The average number of young Lerots which are produced at a single birth is from four to six.

The common Dormouse is abundantly found in many districts of England, as well as on the Continent, and is in great favor as a domestic pet.

The total length of this pretty little animal is rather more than five inches, the tail being two inches and a half long. The color of its fur is a light reddish-brown upon the back, yellowish-white upon the abdomen, and white on the throat. These tints belong to the adult animal only, as in the juvenile Dormouse the fur is nearly of the same color as that of the common mouse, the ruddy tinge only appearing on the head and sides. It is not until the little creatures have nearly completed a year of existence that they assume the beautiful hues of adult age. The tail is thickly covered with hair, which is arranged in a double row throughout its length, and forms a slight tuft at the extremity. The head is rather large in proportion to the body, the ears are large and broad, and the eye full, black, and slightly prominent.

The Dormouse is a nocturnal animal, passing the whole of the day in its warm and neatly constructed nest, which is generally built in the most retired spot of some thick bush or small tree. It is a very active little creature, leaping from branch to branch, and traversing the intricate mazes of the brushwood with such ready fleetness, that it can scarcely be taken by a human hand. Generally, when a Dormouse is captured, it is secured while sleeping in its nest, for during its slumbers it is so deeply buried in repose that it can be handled without offering resistance or attempting escape. The food of the Dormouse consists of various fruits and seeds, such as acorns, nuts, haws, and corn.

As the animal is one of the hibernaters, it is in the habit of gathering together a supply of dried food, to afford occasional nourishment during the long wintry months when it lies in its bed, imprisoned in the bands of irresistible sleep. Like many other hibernating animals, the Dormouse becomes exceedingly fat towards the end of autumn, and is therefore enabled to withstand the severity of the winter season better than if it retired into its home in only its ordinary condition. As soon as the weather becomes cold, the Dormouse retires into its nest, and there slumbers throughout the entire winter, waking up for a short period whenever a milder temperature breaks the severity of the frost, and after taking a little nourishment, sinking again into its former lethargy. Several interesting experiments have been made on this animal in connection with the phenomenon which is termed hibernation, and with the same results as have already been mentioned when treating of the hedgehog and the bat.

COMMON DORMOUSE.—*Muscardinus avellanarius.*

This hoard of provisions is not gathered into the nest, which is solely employed for the purpose of warmth and concealment, but is hidden away in sundry convenient nooks and crannies, close to the spot where the nest is placed. Comparatively little of the store is eaten during the winter, unless, indeed, the weather should happen to be peculiarly mild, but it is of very great service in the earlier part of the spring, when the Dormouse is awake and lively, and there are as yet no fresh fruits on which it could feed.

The Dormouse is rather gregarious in its habits, so that whenever one nest is discovered, several others may generally be found at no very great distance. These nests are of considerable dimensions, being about six inches in diameter, and are composed of grass, leaves, and similar substances. The entrance to the nest is from above.

The young animals are generally three or four in number at a birth, and make their appearance about the end of spring, or the beginning of summer. It is probable that there may be a second brood towards the end of autumn, as Mr. Bell received from one locality in the month of September one half-grown Dormouse, which had evidently been born in the spring, and three very little specimens, which were apparently not more than a week or two old. They are born blind, but are able to see in a very few days, and in a remarkably short space of time become independent of their parents.

Like many other rodent animals, the Dormouse carries the food to its mouth with its fore-paws, while it sits upright on its hinder legs. It is also able to suspend itself by the hind-feet from any convenient branch, and may often be seen hanging in this manner, and eating as comfortably as if it were seated on firm ground.

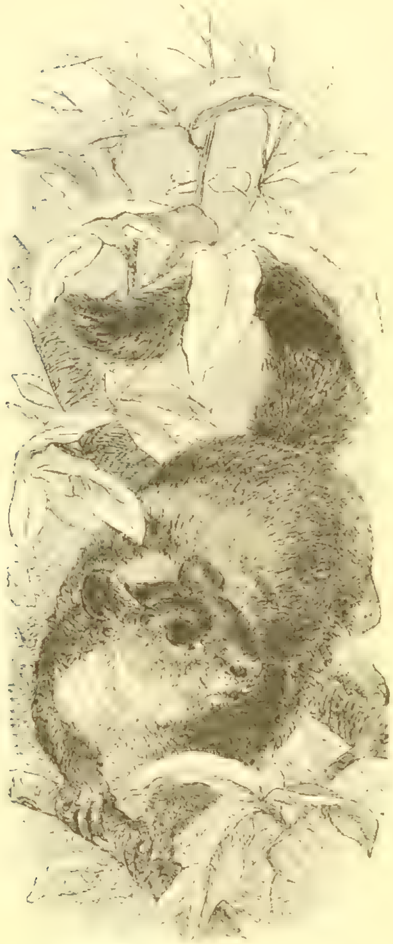
The beautiful and active group of animals of which our Squirrel is so familiar an example, are found in almost every portion of the globe, and, with one or two exceptions, live almost exclusively among the branches of trees. In order to enable them to maintain a firm clasp upon the branches and bark, they are furnished with long, finger-like toes upon the fore-feet, which are armed with sharp curved claws.

In the Flying Squirrels, of which the TAGUAN is a good example, the skin of the flanks is modified in a method similar to that which has already been noticed in the Petaurists of Australia and the Colugo of Java. This skin is so largely developed, that when the animal is sitting at its ease, its paws but just appear from under the soft folds of the delicate and fur-clad membrane. When the creature intends to make one of its marvellous leaps, it stretches all its four limbs to their fullest extent, and is upborne through the air on the parachute-like expansion which extends along its sides. This animal is a native of India, where it is tolerably common.

TAGUAN—*Pteromys petaurista.*

It is rather a large species, as its total length is nearly three feet, the tail occupying about one foot eight inches, measured to the extremity of the long hairs with which it is so thickly clothed. The general color of this animal is a clear chestnut, deepening into brown on the back, and becoming more ruddy on the sides. The little pointed ears are covered with short and soft fur of a delicate brown, and the tail is heavily clad with bushy hairs, grayish-black on the basal portions of that member, and sooty-black towards the extremity. The parachute membrane is delicately thin, scarcely thicker than ordinary writing-paper, when it is stretched to its utmost, and is covered with hair on both its surfaces, the fur of the upper side being chestnut, and that of the lower surface nearly white. A stripe of grayish-black hairs marks the edge of the membrane, and the entire abdomen of the animal, together with the throat and the breast, is covered with beautiful silvery grayish-white fur.

There are many other Flying Squirrels, belonging to different countries, but presenting very similar characteristics of form and character. They are all playful and lively animals, and engage in the most gamesome sports as they chase each other about the branches of the tree on which they have taken up their residence. Among these creatures we may record the names of the Assapan, or Flying Squirrel of America, the Polatouche of Siberia, and the Rasoo of India.



ASSAPAN.—*Sciurópterus volucella.*

Squirrels are found in every part of the world excepting in Australia. Even in the latter country there are flying animals that so closely resemble the Flying Squirrels it is impossible to determine them without examining the teeth, which are those of the curious forms seen among the pouched animals.

One species only of the Flying Squirrels is native to North America. It is a very common animal in New England, and often proves a pleasing pet, being easily tamed. It extends through the eastern portion of the continent, and into South America as far as Guatemala.

The Chickaree (*Sciurus hudsonicus*), called Red Squirrel in the country, is a familiar form. Like many other of our native animals, this exhibits more than one variety. A Western form, the same species, but varying in some coloration or markings, is found in the Rocky Mountains. This is a noisy little creature, and gains its name from its usual cry.

The Gray Squirrel (*Sciurus carolinensis*) is familiar to all in our country side. Its large size renders it an attractive game for the hunter. The markets in winter are well supplied with them.

In the South a variety is found, somewhat smaller. Another variety is found in Yucatan and Mexico, which is intermediate between the last mentioned and the first.

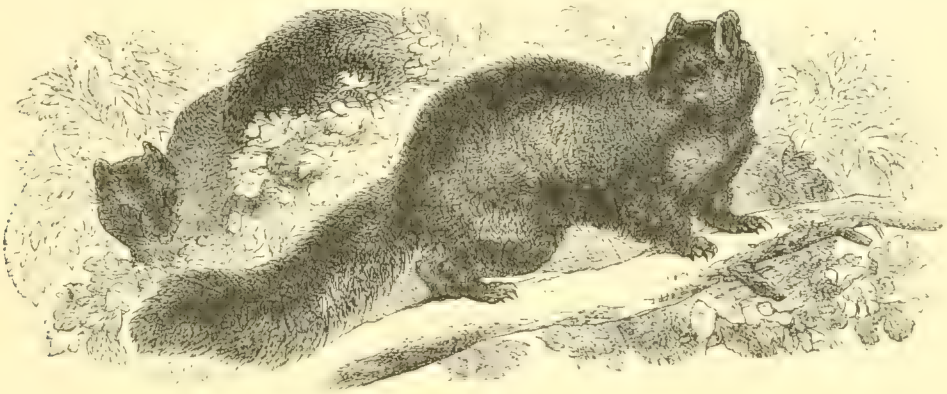
The eastward range of this Squirrel is New Brunswick. It is remarkable for its habits of migration. Dr. Bachman, the eminent naturalist of South Carolina, witnessed a migration of these animals in the year 1808, in autumn. A short distance above Albany a troop of Gray Squirrels suddenly made their appearance. They swam the Hudson in some places between Waterford and Saratoga. Those which were noticed crossing the river, were swimming deeply and awkwardly, with their bodies submerged. Many were drowned, and those which were fortunate in reaching the opposite bank were so wet and fatigued that they were readily killed. The motive for this extraordinary movement was supposed to be the temporary failure of supplies of food.

The Fox Squirrel (*Sciurus niger*) is a large animal, having three distinct varieties. The Northern Fox Squirrel has a length of body varying from thirteen to fourteen inches. In the South it is called Cat Squirrel.

Another form is the California Gray Squirrel (*Sciurus fossor*). It differs in being larger than the Eastern form, and has a much larger tail. It has none of the reddish hue on the back so characteristic of the latter. Collies' Squirrel is a near relative, and has its *habitat* in the neighboring State of Mexico.

Abert's Squirrel (*Sciurus äberti*) is found in Arizona and Colorado. It is peculiar in having in winter long tufts of hair on the ear-tips. The ears are very large. Like other species, it is subject to the albinistic influence; and the black varieties are often found. Eight other species are found in the warmer portions of America.

The genus *Tamias* embraces a group of pretty squirrels, a notable member of which is the familiar Chipmuck, or Striped Squirrel (*Tamias striatus*). Their forms resemble the Spermophiles, the next succeeding group. Four species are known, three of them being confined to North America. The fourth species is found in the northern portions of both continents. No other animal is more familiar to the country side than this cheery little Chipmuck, Chipping, or Ground Squirrel, as it is variously termed. Hackee is another name, known more in the Middle States. Old stone walls seem to be the favorite resort of this little creature, and every country boy finds such localities certain to yield ready game to his box-trap. Its *habitat* is from Minnesota to the Atlantic, and from Canada to Georgia. It is not found in the alluvial districts of Carolina, nor in Florida.



BLACK SQUIRREL.—*Sciurus niger.*

The Northern Chipmuck (*T. borealis*) is found equally abundant in Northeastern Europe, Northern Asia, and Northwestern America, southwards nearly to the United States. Several varieties are known in the Western plains and the Rocky Mountain Range.

Harris's Chipmuck is a New Mexican and Californian species. It is peculiar in being an inhabitant of the desert, instead of the woodland.

Another species is named for the naturalist Say—being first described by him in 1823—from specimens sent from the Arkansas River. Its habits resemble closely those of the Eastern form.

The Black Squirrel has most appropriately been named, for the whole of its fur, with very slight and variable exceptions, is dyed with the deepest jet.

Even the abdomen and under parts of the body, which in almost all quadrupeds are of a lighter hue than the back, are in the Black Squirrel of the same sable tinge, with the exception of a few small tufts of white hairs which are scattered at wide and irregular intervals. A few single white hairs are also sown sparingly upon the back, but are so few in number as to escape a mere casual glance. The tail is also slightly flecked with these white hairs. The total length of this animal is about two feet ten inches, the tail being about thirteen inches in length, measured to extremity of the fur. When the creature spreads its tail to its full width, it measures nearly five inches in diameter in the largest part.

The Black Squirrel is a native of many parts of Northern America, and is tolerably common in some localities, though very scarce in others. It is a curious fact, that it vanishes before the advent of the common northern Gray Squirrel, and in many instances has been driven from some of its private haunts and supplanted by the more powerful intruder. It seems to be rather a timid animal, as it has been observed to fly in terror when threatened with the anger of the Red Squirrel (*Sciúrus hudsónius*). Despite its cowardice, it is rather a fierce creature when captured, biting savagely at its opponent, and is not very easily tamed. One of these animals which was partially domesticated, was always noted for, its evil temper, and justified the opinion that had been formed of its disposition by biting a piece from a servant's hand as cleanly as if it had been cut with a chisel. The injury was of so severe a nature that the man was obliged to go into a hospital for some weeks.

When undisturbed in its native domains, it appears to be an active and lively animal, and is remarkable for a curious habit of suddenly ceasing its play and running to the water side to refresh itself before it recommences its sport. In drinking it does not lap after the manner of dogs and cats, but bends over the water, and thrusting its nose fairly beneath the surface, drinks a steady draught. After it has satisfied its thirst, it sits on its hind legs, and with its fore-feet carefully washes its face, occasionally dipping its paws into the water, as if to perform its ablutions in the most effectual manner.

The skin of the Black Squirrel is rather valuable, as it not only possesses the uniform jetty hue which is so universally admired in ornamental furs, but is also peculiarly smooth and glossy. As is generally the case with dark coated animals, the hairs are lighter towards the base, and partake of a slaty-blue tint.

All the preceding examples of the Squirrel tribe are remarkable for their extreme agility in climbing trees, traversing the branches, and making extraordinary leaps from one bough to another or from some elevated spot to the earth. The Ground Squirrels, however, are intended to abide on the earth, and are seldom known to ascend trees of any great height. As they possess cheek-pouches, they are placed in a separate genus, under the name of Támias, which is a Greek word, signifying a storekeeper, and are separate from the true Squirrels, which are not furnished with those appendages.

The Hackee, or Chipping Squirrel, as it is sometimes termed, is one of the most familiar of North American quadrupeds, and is found in great numbers in almost every locality. It is a truly beautiful little creature, and deserving of notice both on account of the dainty elegance of its form, and the pleasing tints with which its coat is decked. The general color of the Hackee is a brownish-gray on the back, warming into orange-brown on the fore-head and the hinder quarters. Upon the back and sides are drawn five longitudinal black stripes and two streaks of yellowish-white, so that it is a most conspicuous little creature, and by these peculiar stripes may easily be distinguished from any other animal. The abdomen and throat are white. It is slightly variable in color according to the locality in which it exists, and has been known to be so capricious of hue as to furnish specimens of pure white and jet black. As a fur it is extremely elegant, and if it were not quite so common would long since have taken nearly as high a rank as the sable or ermine.

The length of the Hackee is about eleven inches, the tail being about four inches and a half in length. It is, however, slightly variable in dimensions as well as in color.

The Hackee is one of the liveliest and briskest of quadrupeds, and by reason of its quick and rapid movements, has not inaptly been compared to the wren. It is chiefly seen among brushwood and small timber; and as it whisks about the branches, or shoots through their interstices with its peculiar, quick, jerking movements, and its odd, quaint, little clucking cry, like the chip-chipping of newly-hatched chickens, the analogy between itself and the bird is very apparent. As it is found in such plenty, and is a bold little creature, it is much persecuted by small boys, who, although they are not big or wise enough to be entrusted with guns, wherewith to work the destruction of larger game, arm themselves with long sticks, and by dexterous management knock down many a Hackee as it tries to escape from its pursuers by running along the rail fences. Among boys the popular name of the Hackee is the "Chipmuck."

It is a burrowing animal, making its little tunnels in various retired spots, but generally preferring an old tree, or the earth which is sheltered by a wall, a fence, or a bank. The burrows are rather complicated, and as they run to some length, the task of digging the animal out of its retreat is no easy one. In the work of Messrs. Audubon and Bachman is given the following spirited narrative of an attack upon the home of some unfortunate Hackees. "This species is to a certain extent gregarious in its habits. We had in autumn marked one of its burrows which we conceived well adapted to our purpose, which was to dig it out. It was in the woods, in a sandy piece of ground, and the earth was strewed with leaves to the depth of eight inches, which we believed would prevent the frost from penetrating to any considerable depth. We had the place opened in January, when the ground was covered with snow about five inches deep. The entrance of the burrow had been closed from within. We followed the course of the small winding gallery with considerable difficulty. The hole descended at first almost perpendicularly for about three feet. It then continued, with one or two windings, rising a little nearer the surface until it had advanced about eight feet, when we came to a large nest, made of oak leaves and dried grasses. Here lay snugly covered three Chipping Squirrels.

"Another was subsequently dug from one of the small lateral galleries, to which it had evidently retreated to avoid us. They were not dormant, and seemed ready to bite when taken in the hand; but they were not very active, and appeared somewhat sluggish and benumbed, which we conjectured was owing to their being exposed to sudden cold from our having opened their burrow. There was about a gill of wheat and buckwheat in the nest; but in the galleries, which we afterwards dug out, we obtained about a quart of the beaked hazel nuts (*Córylus rostráta*), nearly a peck of acorns, some grains of Indian corn, about two quarts of buckwheat, and a very small quantity of grass seeds."

CHIPMUCK.—*Tamias lysteri.*

Whenever menaced by one of the numerous foes by which so defenceless and conspicuous an animal is sure to be surrounded, the Hackee makes at once for its burrow, and is there secured from the attacks of nearly every enemy. One foe, however, cares nothing for the burrow, but follows the poor Hackee through its windings, and never fails to attain its sanguinary object. This remorseless foe is the stoat, or ermine, one of which animals has been detected in entering a Hackee's burrow, where it remained for a few minutes, and then returned, licking its lips, and appearing highly satisfied with its proceedings. When the burrow was examined in order to ascertain the amount of slaughter which the stoat had performed, one female Hackee and five young were found lying dead in their home, the stoat having contented itself with sucking their blood, without deigning to eat their flesh.

From the principal burrow the Hackee drives several supplementary tunnels, in which it lays up its stock of provisions. The general nature of this store, and the amount of treasure which is garnered within the burrows, may be gathered from the account which has just been quoted. When the Hackee carries off the beaked nuts into its cave, it goes through its work in a very business-like manner. Fearing lest the sharp "beak" of the nut may hurt its cheeks when it puts the fruit into its pouch, it bites off the sharp point, and then deliberately pushes it into one of the pouches with the assistance of its fore-paws. Another and another are similarly treated, and taking a fourth nut between its teeth, the Hackee dives into its burrow, packs away its treasures methodically, and then returns for another cargo. It is rather curious that it always carries four nuts at each journey. As the little creature goes along with its cheek-pouches distended to their utmost limits it has the most ludicrous aspect imaginable, its cheeks prodigiously swelled, and laboring most truly under an embarrassment of riches.

The Hackee moves into its winter quarters early in November, and, excepting occasional reappearances whenever the sun happens to shine with peculiar warmth, is not seen again until the beginning of spring. The young are produced in May, and there is generally a second brood in August. Their number is about four or five. The male Hackee is rather a pugnacious animal, and it is said that during their combats their tails are apt to snap asunder from the violence of their movements. It is undoubtedly true that those members are wonderfully brittle, but whether they undergo such spontaneous amputation is not so certain.

Pretty as it is, and graceful as are its movements, it hardly repays the trouble of keeping it in a domesticated state; for its temper is very uncertain, and it is generally sullen towards its keeper. Although the food of the Hackee is mostly of a vegetable character, it is occasionally diversified with other substances; for the Chipping Squirrel, like his relative, is occasionally carnivorous in his appetite. One of these animals was detected in the very act of robbing a bird's nest and devouring the callow young.

BETWEEN the squirrels and the marmots there are one or two intermediate links, one of which has already been noticed in Támias, and another is found in the genus Spermóphilus; also in Cynomys, to which the PRAIRIE DOG belongs.

The Prairie Dog, as it is popularly called, is found in very great plenty along the course of the Missouri and its tributaries, and also near the River Platte. It congregates together in vast numbers in certain spots where the soil is favorable to its subterranean habits of life and the vegetation is sufficiently luxuriant to afford it nourishment. The color of this animal is a reddish-brown upon the back, mixed with gray and black in a rather vague manner. The abdomen and throat are grayish-white, and the short tail is clothed for the first half of its length with hair of the same tint as that of the body, and for the remaining half is covered with deep, blackish-brown hair, forming a kind of brush. The cheek-pouches are rather small, and the incisor teeth are large and protruding from the mouth. The length of the animal rather exceeds sixteen inches, the tail being a little more than three inches long. The cheek-pouches are about three-quarters of an inch in depth, and are half that measurement in diameter.

The Prairie Dog is a burrowing animal, and as it is very gregarious in its habits, the spot on which it congregates is literally honeycombed with its tunnels. There is, however, a kind of order observed in the "Dog-towns," as these warrens are popularly called, for the animals always leave certain roads or streets in which no burrow is made. The affairs of the community seem to be regulated by a single leader, called the Big Dog, who sits before the entrance of his burrow, and issues his orders from thence to the community. In front of every burrow a small heap of earth is raised, which is made from the excavated soil, and which is generally employed as a seat for the occupant of the burrow.

As long as no danger is apprehended, the little animals are all in lively motion, sitting upon their mounds, or hurrying from one tunnel to another as eagerly as if they were transacting the most important business. Suddenly a sharp yelp is heard, and the peaceful scent is in a moment transformed into a whirl of indistinguishable confusion. Quick barks resound on every side, the air is filled with a dust-cloud, in the midst of which is indistinctly seen an intermingled mass of flourishing legs and whisking tails, and in a moment the populous "town" is deserted. Not a "dog" is visible, and the whole spot is apparently untenanted. But in a few minutes a pair of dark eyes are seen gleaming at the entrance of some burrow, a set of glistening teeth next shine through the dusky recess, and in a few minutes first one and then another Prairie Dog issues from his retreat, until the whole community is again in lively action.

The title of Prairie Dog has been given to this animal on account of the sharp yelping sound which it is in the habit of uttering, and which has some resemblance to the barking of a very small and very peevish lapdog. Every time that it yelps it gives its tail a sharp jerk. This peculiar sound is evidently employed as a cry of alarm; for as soon as it is uttered all the Prairie Dogs dive into their burrows, and do not emerge again until they hear the shrill whistle which tells them that the danger is past.

As it is so wary an animal, it is with difficulty approached or shot, and even when severely wounded it is not readily secured, owing to its wonderful tenacity of life. A bullet that would instantly drop a deer has, comparatively, no immediate effect upon the Prairie Dog, which is capable of reaching its burrow, even though mortally wounded in such a manner as would cause the instantaneous death of many a larger animal. A tolerably large bullet through the brain seems to be the only certain method of preventing a Prairie Dog from regaining his stronghold. The mode by which this animal enters the burrow is very comical. It does not creep or run into the entrance, but makes a jump in the air, turning a partial somersault, flourishing its hind legs and whisking its tail in the most ludicrous manner, and disappearing as if by magic. Scarcely has the spectator recovered from the ludicrous effect of the manœuvre, when the animal begins to poke out his head again, and if not disturbed soon recommences his gambols.

PRAIRIE DOG.—*Cynomys ludovicianus.*

The burrows of the Prairie Dog are generally made at an angle of forty degrees, and after being sunk for some little distance, run horizontally, or even rise towards the surface of the earth. It is well known that these burrows are not only inhabited by the legitimate owners and excavators, but are shared by the burrowing owl and the rattlesnake. According to popular belief, the three creatures live very harmoniously together; but careful observations have shown that the snake and the owl are interlopers, living in the burrows because the poor owners cannot turn them out, and finding an easy subsistence on the young Prairie Dogs. A rattlesnake has been killed near a burrow, and when the reptile was dissected, a Prairie Dog was found in its stomach.

Although it does not endure a domesticated life as well as many of the rodents, it is possessed of very great affection and courage, as is seen from the following anecdote. A hunter was engaged in shooting Prairie Dogs, and had succeeded in killing one animal, which was seated upon the little hillock in front of its burrow. A companion, which had not hitherto dared to expose itself to the hunter's fire, immediately issued from the same burrow, and seizing the body of its friend, dragged it into the hole. The hunter was so touched with this exhibition of true, loving feeling on the part of the little creature, that he never could be induced to shoot another Prairie Dog.

From the most recent accounts, it appears that the Prairie Dog does not hibernate, but that it is as fresh and lively during winter as in the heat of summer.

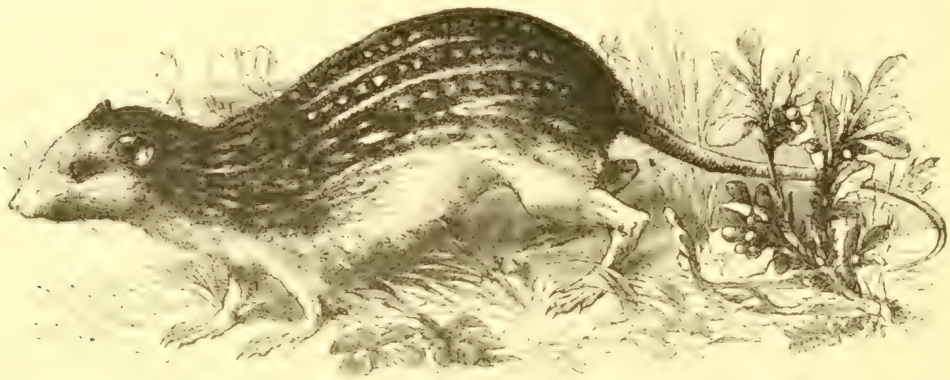
The Prairie Dog (*Cynomys ludovicianus*), erroneously so called, as it is a rodent or gnawing animal, is represented by two species only, the genus being peculiar to North America.

This little creature easily becomes domesticated, and proves a pleasing pet. Its voice, far from being a bark, is like that of its near relatives, squirrel-like.

The Western Prairie Dog (*Cynomys columbianus*) is confined to the region west of the Rocky Mountains. Like the other species, it lives in large companies; sometimes several hundred acres are occupied by their holes. Each burrow has ten or twelve occupants.

An example of the genus Spermóphilus may be found in the beautiful little creature which is scientifically known as Hood's Marmot, but more popularly as the **Leopard Marmot.**

This pretty little animal is about the same size as the hackee, and is remarkable for the brilliant and conspicuous manner in which its fur is diversified with contrasting hues. Along the back are drawn eight pale yellowish-brown bands, and nine dark brown bands of greater width. The five upper bands are marked with pale spots. The coloring is slightly variable, both in distribution and depth of tint, for in some specimens the dark bands are paler than in others, while in several specimens the pale spots have a tendency to merge altogether and form bands. The average length of this creature is nearly eleven inches, the tail slightly exceeding four inches in length. The cheek-pouches are moderate in dimensions. It is an inhabitant of Northern America.



HOOD'S MARMOT.—*Spermóphilus hoodii.*

This animal is said to be more lively and active than any of its relations, and to be remarkably fearless as it whisks about the neighborhood of its home, uttering its sharp little cry of "Seek-seek-seek" continually. This cry is common to many of the Spermóphili, and has given the name of Seek-seek to another species belonging to the same genus. It generally leaves its winter quarters at the beginning of spring, and roams about in search of a mate. At this time the males are very pugnacious, and engage in fierce contests for the possession of some favored individual of the opposite sex. They are very heedless at this time of year, and can be easily caught in ordinary traps.

The burrow of the Leopard Marmot is generally driven perpendicularly into the ground, to the depth of four or nearly five feet; but on the plains of the Upper Missouri, where the soil is sandy and mixed with gravel, the burrow is almost horizontal, and lies barely one foot below the surface. The Leopard Marmot is rather a prolific animal, producing about eight or ten young at a litter. It is said to be destructive to gardens which may happen to be in the vicinity of its home, and is as capable of exercising its teeth upon an antagonist as on its food.

Its bite is remarkably severe for so small an animal, and it is of such a sour disposition that it is always ready to snap at those who attempt to capture or handle it.

SPERMOPHILUS is a genus embracing a few little animals, which are striped or spotted like the preceding, but are long-bodied and have a more slender and often shorter tail. The figure of Hood's Marmot in this volume is quite characteristic of the group. They have well-developed cheek-pouches. They are confined to the colder portions of North America, and Europe and Asia. None are found east of the plains or prairies. They range westward to the Pacific coast, and southward to the plains of Northern Mexico. Several species are remarkable for their carnivorous propensities. They devour mice and such small game. The farmers are troubled by their carrying off small chickens.

Murray's "Geographical Distribution of Animals" enumerates twenty-five species, of which one is extinct. Of these, nine are of the Old World, and fifteen North American. Two only occur in Europe. Some of the species are called Ground Squirrels. The Line-tailed Spermóphilus is so called. Its *habitat* is Colorado and southward to Mexico.

Franklin's Spermóphile—or Gray-headed—is common as far east as Illinois and Wisconsin, though Audubon and Bachman seem to have overlooked it. Mr. Jillson, a veteran taxidermist, informs us that this Spermóphile was introduced into Tuckerton, New Jersey, in 1867, two pets having escaped. From this pair the species has increased to great numbers, and they are seen in several towns nine miles in different directions from Tuckerton. They inhabit the fields, but never the woodland. They are proving a pest, as the loss of young chickens and turkeys has been considerable since their introduction.

THE BOBAC, or POLAND MARMOT, is one of the true Marmots, and is a native of parts of Northern Europe and Asia.

It is larger than the preceding animals, and appears to be of still greater dimensions, owing to the full coat of thick hair with which it is profusely covered. The color of this animal is a tolerably uniform gray-brown, slightly tinged with yellow, and having a "watered" appearance along the back. The length of the Bobac is rather more than twenty inches, the tail being about six inches long. The Bobac is a gregarious animal, living in small bands of thirty or forty in number, and being always found to prefer dry to moist soil. It does not seem to be fond of elevated situations, but generally takes up its residence on the sides of valleys, where the temperature is not so bleak as on the mountain-top.

Like many other burrowing animals, it lays up a store of provisions for the winter, and generally chooses well-dried hay for that purpose. So hard does the animal labor at amassing this treasure, that in a single burrow there is generally found as much hay as will suffice a horse for a night. It is slightly variable in color, some specimens being more brown than others.

THE common MARMOT is about the size of an ordinary rabbit, and not very unlike that animal in color. The general tint of the fur is grayish-yellow upon the back and flanks, deepening into black-gray on the top of the head, and into black on the extremity of the tail.

It is very common in all the mountainous districts of Northern Europe, where it associates in small societies. The Marmot is an expert excavator, and digs very large and rather complicated burrows, always appearing to reserve one chamber as a storehouse for the heap of dried grasses and other similar substances which it amasses for the purpose of sustaining life during the winter. The chamber in which the animal lives and sleeps is considerably larger than the storehouse, measuring, in some cases, as much as seven feet in diameter. The tunnel which leads to these chambers is only just large enough to admit the body of the animal, and is about six feet in length.

To these burrows the Marmot retires about the middle of September, and after closing the entrance with grass and earth, enters into the lethargic hibernating state, and does not emerge until the beginning of April. Like other hibernating animals, they are very fat just before they take up their winter-quarters, and as their fur is then in the best condition, they are eagerly sought after by the human inhabitants of the same country. The burrow of the Marmot is always dug in dry soil, and is seldom known to be at all above, or very much below, the line of perpetual snow. In these burrows the young Marmots are born, about three or four in average number. The burrow forms also a stronghold into which the Marmot can retire on the least alarm. It is so wary an animal that it always plants one of its number to act as a sentinel, and on the first symptom of danger, he gives the alarm cry, which is a signal for every Marmot to seek the recesses of its subterranean home.

BOBAC.—*Arctomys bobac.*

The Marmot is a clumsy looking animal, and is not very active. Its movements are rather slow, and devoid of that brilliant activity which distinguishes the Leopard Marmot.

Although it is easily tamed when taken young, it hardly repays the trouble of its owner, as it is a very unintellectual creature, and is ever too ready to use its powerful teeth upon the hand of any one who may attempt to handle or caress it. Naturally it is a timid animal, but when it finds itself unable to escape, it turns to bay and fights most desperately by means of the weapons with which its jaws are furnished.

The genus Arctomys is represented in America by three species. Animals of this group are not found out of the northern and middle portions of North America, Europe and Asia.

The Woodchuck (*Arctomys monax*) is a most familiar creature in our countryside. It is the legitimate game of the rural small boy. With his mongrel cur, to "dig out a Woodchuck," our urchin is ever ready to rush to the conflict.

The generic term means literally Bear Mouse; so called, doubtless, on account of the bear-like aspect of the animal's head. The Woodchuck is often of considerable size, measuring fourteen inches in length; its tail, exclusive of this, is but four inches.

This species is found from the Carolinas to Hudson's Bay, and from the Atlantic coast to Missouri and Wisconsin. It burrows, forming large excavations in which are stored its winter provisions.

It hibernates in the winter, after carefully closing its burrow. This species resembles somewhat the European Marmot.

The Rocky Mountain Marmot (*Arctomys flaviventor*) was first described by Audubon and Bachman in 1841, from a specimen brought from California. It is, unlike the preceding, alpine in habits. Its size is considerably more; in some instances measuring eighteen inches in length. The tail is longer, measuring to the tips of the hairs ten inches. Black specimens are often seen.

The Hoary Marmot (*Arctomys pruinosus*), called also the "Whistler," is the largest of the species; its length being from twenty-three to twenty-five inches, the tail being nearly half as long.

The three species seem to be so distributed as not to encroach on the territory of each; the *habitat* of this one being northward to the Arctic Circle, the Columbia River being its southernmost limit.

Some interesting facts are known concerning the hibernation of the Woodchuck, which tend to invalidate the statement of earlier authors that the creature stores up provisions, though the latter may be the case in the more southern portions of its *habitat.*

The common Woodchuck of our Eastern States retires to hibernate about the time of the autumnal equinox, and, curiously, comes forth about the time of the vernal equinox. It is singular that the creature should retire so early, when its favorite food, red clover, is in full growth, and the weather usually fine for some weeks after this period. And it is equally strange that the animal should come forth so early, when it is usual to see the ground covered by snow, when no green thing is to be found near his haunts.

Dr. Bachman, who wrote a portion of the work on mammals published by Audubon and Bachman, marked a burrow in which he knew were two Woodchucks, a pair. Early in November he had it opened, and found two Woodchucks lying coiled up close to each other in a nest of dry grass, twenty-five feet from the entrance. They were perfectly dormant.

This Woodchuck gives birth to four or six young, about the last week in April. A branch gallery is often seen in their burrows, which is used for depositing their dejections. This is regarded as quite unique in the history of mammals.

At the end of the rodents are placed the singular animals which are grouped together under the title of Aspalácidæ, or Mole Rats, the word Aspalax, or Spalax, being the Greek term for a mole. The incisor teeth of these animals are extremely large, and project beyond the lips. The external ears are either wholly wanting or are of very small dimensions. The eyes are small, and in some species are concealed by the skin. The body is heavily and clumsily made, the tail is either very short or entirely absent, and the head is large and rounded.

The common Mole Rat, which is also known by its Russian name of Slepez, is a native of Southern Russia, Asia Minor, Mesopotamia, and Syria. Like the ordinary Mole, to which it bears no little external resemblance, it passes its existence in the subterranean tunnels which it excavates by means of its powerful claws. As it but seldom ventures into the light of day, it stands in no need of visual organs, but is compensated for their absence by the very large development of the organs of hearing. The place of the eyes is taken by two little round black specks, which lie under the fur-covered skin, so that even if they were sensitive to light, they would be unable to perceive the brightest rays of the noontide sun. The ears, however, are extremely large, and the hearing is exceedingly sensitive, so that the animal receives earlier information of danger through its sense of hearing than through that of sight, which latter faculty would indeed be useless in its dark abode. Sometimes the Slepez leaves the burrow and lies basking in the warm sunshine, but upon the least alarm, or unexpected sound, it plunges into its tunnel, and will not again make its appearance until it feels perfectly assured of safety.

Should it be unexpectedly attacked, it assumes an offensive attitude, and trusting to its delicate sense of hearing to inform it of the direction in which the foe is approaching, bites most savagely with its long chisel-like incisors. While engaged in combat, or while threatening its adversary, it utters a sharp crying snort at short intervals.

MOLE RAT, OR SLEPEZ.—*Spalax typhlus.*

The food of the Mole Rat is believed to be entirely of a vegetable nature, and it is in search of the various plants on which it feeds that it drives its long and complicated tunnels through the soil. It is especially fond of roots, more particularly preferring those of a bulbous character, but will also feed on grain and different fruits, and is said to lay up a store of provisions in a subterranean chamber connected with its burrow. The usual form of the Mole Rat's habitation and hunting-ground may be easily imagined. A series of horizontal tunnels, or main roads, are driven through the ground at no great depth from the surface of the earth, and are connected with a number of chambers excavated at some depth, and with an endless variety of shallow passages which are made in the course of the animal's daily peregrinations in search of food.

The Russian peasants have an idea, that if any one will have the courage to seize a Slepez in his bare hands, permit the animal to bite him, and then squeeze it to death between his fingers, he will ever afterwards possess the power of curing goitre by the touch of his hands. The general color of the Slepez is a very light brown, slightly tinged with red in some parts, and fading into an ashen-gray in others. Its total length is about ten or eleven inches, and the tail is wanting. The head is broad, flat on the crown, and terminates abruptly at the muzzle. The feet are short, and the claws small.

This animal is presumed to be the Blind Mole of the ancient Greek authors, and if so, affords another of the many instances where the so-called errors of the old writers on natural history have proved, on further acquaintance, to be perfectly correct. The specific name *typhlus* is a Greek word, signifying blind, and has been given to the Slepez on account of its absolute deprivation of external eyes.

The incisor teeth of the Coast Rat, or Sand Mole, are even larger in proportion than those of the preceding animal, and those of the upper jaw are marked by a groove running throughout their length. The fore-feet are furnished with long and powerful claws, that of the second toe being the largest. The eyes are exceedingly small, the external ears are wanting, and the tail is extremely short.

The Coast Rat is an inhabitant of the Cape of Good Hope and the coasts of Southern Africa, where it is found in tolerable profusion, and drives such multitudes of shallow tunnels that the ground which it frequents is rather dangerous for horsemen, and not at all pleasant even to a man on foot. The burrows are made at so short a distance from the surface that the earth gives way under the tread of any moderately heavy animal. Mr. Burchell, the well-known African traveller, narrates that in traversing the great sand flats of Southern Africa, he was often endangered by his feet sinking into the burrows of the Coast Rat, which had undermined the light soil in every direction. The animal is rather slow of foot upon the surface of the ground, but drives its subterranean tunnels with marvellous rapidity, throwing up little sandy hillocks at intervals, like those of the common mole. On account of this propensity it has received the name of *Zand Moll*, or Sand Mole, from the Dutch Boers who inhabit the Cape.

The color of the Sand Mole is a uniformly light grayish-brown, rather variable in tinting. As it is very soft and full in texture, and can be obtained in great quantities, it might be profitably made a regular article of trade. The Sand Mole is as large as our ordinary wild rabbit, being about fifteen inches in total length, the tail measuring about three inches.

THERE has been much confusion between the two Geomyd animals, which have been by several authors considered to be identical with each other. They are, however, to be easily distinguished from each other by the deep longitudinal grooves which run along the upper incisors of the present animal, and the smooth or slightly grooved incisors of the succeeding species.

The FUR COUNTRY POUCHED RAT is a native of Canada, and is remarkable for the enormous size of the cheek-pouches. The color of this animal's fur is generally of a pale gray washed with yellow, fading into a slaty-blue towards the base of each hair. The interior of the pouches, the abdomen, and the tail, are covered with white hair, that which lines the pouches being very short and fine. A dusky spot is observable behind each ear, the teeth are yellow and the claws white. The central claw of the fore-feet is almost deserving of the title of talon, as it is powerfully made and nearly half an inch in length. The total length of this animal is nearly ten inches, the tail measuring about two inches in length.

It is rather gregarious in its habits, associating together in moderately large bands, and undermining the ground in all directions. It is a vegetable feeder, preferring the bulbous roots of the quamash, or camas (*Scilla esculenta*), to any other diet, and is therefore called by some writers, the Camas Rat. This title is, however, given to several allied animals. It also feeds on nuts, roots, grain, and seeds of various kinds. The burrow of this animal is not very deep, but runs for a considerable distance in a horizontal direction, and along its course occasional hillocks are thrown up, by means of which it may be traced from the surface.

Family *Saccomyidæ* includes a group of curiously formed animals, having pouches on the exterior surface of the cheeks, which are lined with a furry integument, and open outside the mouth. Under the common name Pocket Mouse, seven species are known, mostly inhabiting the Pacific slope, the great plains near the Rocky Mountains, and Mexico.

Two other allied animals are known; one called the Kangaroo Rat (*Dipodomys phillipsi*) has very long legs, long tail, and a slender, small body. Its *habitat* is the Pacific slope. An allied species called Ord's Pocket Rat, inhabits the Rocky Mountains and southward to Mexico.

Genus *Thomomys* includes four species, called Pocket Gophers; each named according to its place of abode, extending from the Pacific coast to the Rocky Mountains, and southward to Mexico and California.

Family *Geomyidæ*, Earth Rats literally, are distinguished by having extremely large fore-feet and claws. The term Gopher (often appropriated for other animals) is the common name of these creatures.

The Common Pocket Gopher (*Geomys barsarius*) abounds in the region about the Mississippi River, and southward to Texas. The short legs and soft hair of these creatures suggest the moles. Five other species are known, inhabiting Central America and Mexico. This animal was formerly called the CANADA POUCHED RAT and is sometimes known by the name of "Mulo."

The incisor teeth of this animal are extremely long, and project beyond the lip, so as to be visible even at a profile view. The cheek-pouches are of great dimensions, measuring nearly three inches in depth, and reaching from the sides of the mouth to the insertion of the shoulder. They are lined with a soft covering of short, fine hairs. The total length of the Canada Pouched Rat is about one foot, the tail being two inches long. The weight of an ordinary sized adult specimen is about fourteen ounces. In shape, it is heavily made and very clumsy, bearing no slight resemblance to the ordinary mole of England. Its fur is about half an inch in length upon the back, and much shorter upon the abdomen. Its color is a reddish-brown upon the upper parts of the body, fading into ashy-brown upon the abdomen, and the feet are white. The first third of the tail is clothed with short hair of the same color as that of the back, but the remaining two-thirds are devoid of hairy covering.

CANADA POUCHED RAT.—*Geomys bursarius.*

This animal is a burrower, and is most destructive among plantations, as it is in the habit of eating the roots which happen to intercept the course of its tunnel, and has been known thus to destroy upwards of two hundred young trees in a few days and nights. Its ravages are not solely restricted to young plants, but are often extended to old and full-grown fruit-trees. It continues its labor by day as well as by night, but is not readily discovered at its work, as it always ceases its labor at the least sound from above. The burrows of the Mulo are rather complicated, and are well described in the following extract from Audubon and Bachman:

"Having observed some freshly thrown up mounds in M. Chouteau's garden, several servants were called and set to work to dig out the animals, if practicable, alive; and we soon dug up several galleries worked by the Muloes, in different directions.

"One of the main galleries was about a foot beneath the surface of the ground, except when it passed under the walks, in which places it was sunk rather lower. We turned up this entire gallery, which led across a large garden-bed and two walks into another bed, where we discovered that several fine plants had been killed by these animals eating off their roots just beneath the surface of the ground. The burrow ended near these plants under a large rose-bush. We then dug out another principal burrow, but its terminus was among the roots of a large peach-tree, some of the bark of which had been eaten off by these animals. We could not capture any of them at this time, owing to the ramification of their galleries having escaped our notice whilst following the main burrows. On carefully examining the ground, we discovered that several galleries existed that appeared to run entirely out of the garden into the open fields and woods beyond, so that we were obliged to give up the chase. This species throws up the earth in little mounds about twelve or fifteen inches in height, at irregular distances, sometimes near each other, and occasionally ten, twenty, or even thirty paces asunder, generally opening near a surface well covered with grass or vegetables of various kinds."

The burrow was probably sunk lower wherever it crossed a path, because the sense of hearing in this animal is so extremely acute, that it would be much annoyed by the continual sound of human footsteps immediately over its head.

Although it spends the greater part of its existence beneath the earth, it is frequently seen above the surface of the ground, as it resorts to the open air for the purpose of basking in the sun, or procuring leaves which have been brightened and vivified by the rays of the sun, as a change from the roots on which it chiefly depends for subsistence. When it revisits the regions of upper day, it emerges from the earth in some hitherto unbroken spot, pushing the soil upwards and causing a kind of miniature earthquake before it makes its appearance. Presently the head and shoulders of the animal emerge from the lump of earth, and shaking the loose mould from its fur, it draws itself entirely out of its burrow. It then runs forward for a yard or two, searching for food, nibbling off the green blades with its teeth, and stowing them into its cheek-pouches with the aid of its fore-paws. When it has filled the pouches, it runs back to the hole through which it had issued, and vanishes immediately from sight.

Should it be alarmed while out of its tunnel, it plunges precipitately into its stronghold, and drives an entirely new burrow in another direction, not venturing to entrust itself to that through which it had passed before it was alarmed.

The long and sharp incisor teeth are formidable weapons, and can be used with great effect upon an adversary. It is a sufficiently savage creature, and when captured or annoyed, bites fiercely in every direction, and squeals with rage. In captivity it is always employing these teeth upon every object that it can reach, and has even been detected in the act of endeavoring to cut its way through the wooden planks of the room in which it was placed. Two of these animals once contrived to get into a pair of boots belonging to their owner, and not choosing to take the trouble of returning by the same aperture through which they had entered, they cut a large hole in the toes, and so made their exit. They seemed to have a special liking for leather, as they afterwards gnawed to pieces the leathern straps which were dangling from a portmanteau that lay in the same room.

On the surface of the ground the Canada Pouched Rat is rather slow and clumsy in its movements, as its legs are short and ill-fitted for such locomotion. So short indeed are its limbs, that if it be laid on its back, it has great difficulty in regaining its feet, but flounders about in almost total helplessness until it can seize a blade of grass, a twig, or similar object, by means of which it can draw itself into its normal attitude. In its tunnel, however, it proceeds with considerable activity, going faster than a man can walk, and being capable of running backwards or forwards with equal speed and ease.

The nest of the Mulo is not placed in one of the ordinary tunnels, but in a burrow dug specially for the purpose. It is about eight inches in diameter, globular in shape, and is made of dried herbage externally, and softly lined with hair plucked from the body of the female, and other appropriate substances. From the nest radiate a number of small galleries, which are again connected with smaller branch passages, and seem to conduct the animal to its feeding-grounds. It was formerly imagined that the Mulo was in the habit of filling its pouches with the excavated earth, and of emptying them at the mouth of burrows. This assertion is now disputed, for it is clearly ascertained that the creature only uses its cheek-pouches for the conveyance of its food. A little earth may perchance be imbedded together with the nuts and leaves, but the mistake has evidently arisen from the conduct of the natives, who, when they procure a skin of the Mulo, are accustomed to stuff the pouches with dry earth, for the purpose of preserving them in their distended form.

The animal is found in many parts of Northern America, and has a very wide range.

The Bay Bamboo Rat is one representative of the genus Rhízomys, of which there are several species.

This animal is a native of Nepal, Malacca, and China, and is very injurious to the bamboos, on the roots of which it feeds. In size it equals a rather small rabbit, and in color it is of a uniform ruddy brown, slightly paler on the throat and abdomen. The long incisor teeth are faced with bright red enamel, which gives them a rather conspicuous appearance; the t is short and marked, and the claws are rather small. The peculiar head is of an egg-like form.

THERE are several other genera belonging to this curious family, among which may be noticed the genus Ctenomys, containing the TUCUTUCO, a native of Magellan Straits. This is also a burrowing animal, and the peculiar name by which it is known has been given to it on account of the curious cry which it utters as it is engaged in its subterranean labors, and which is said to resemble the word "Tucutuco."

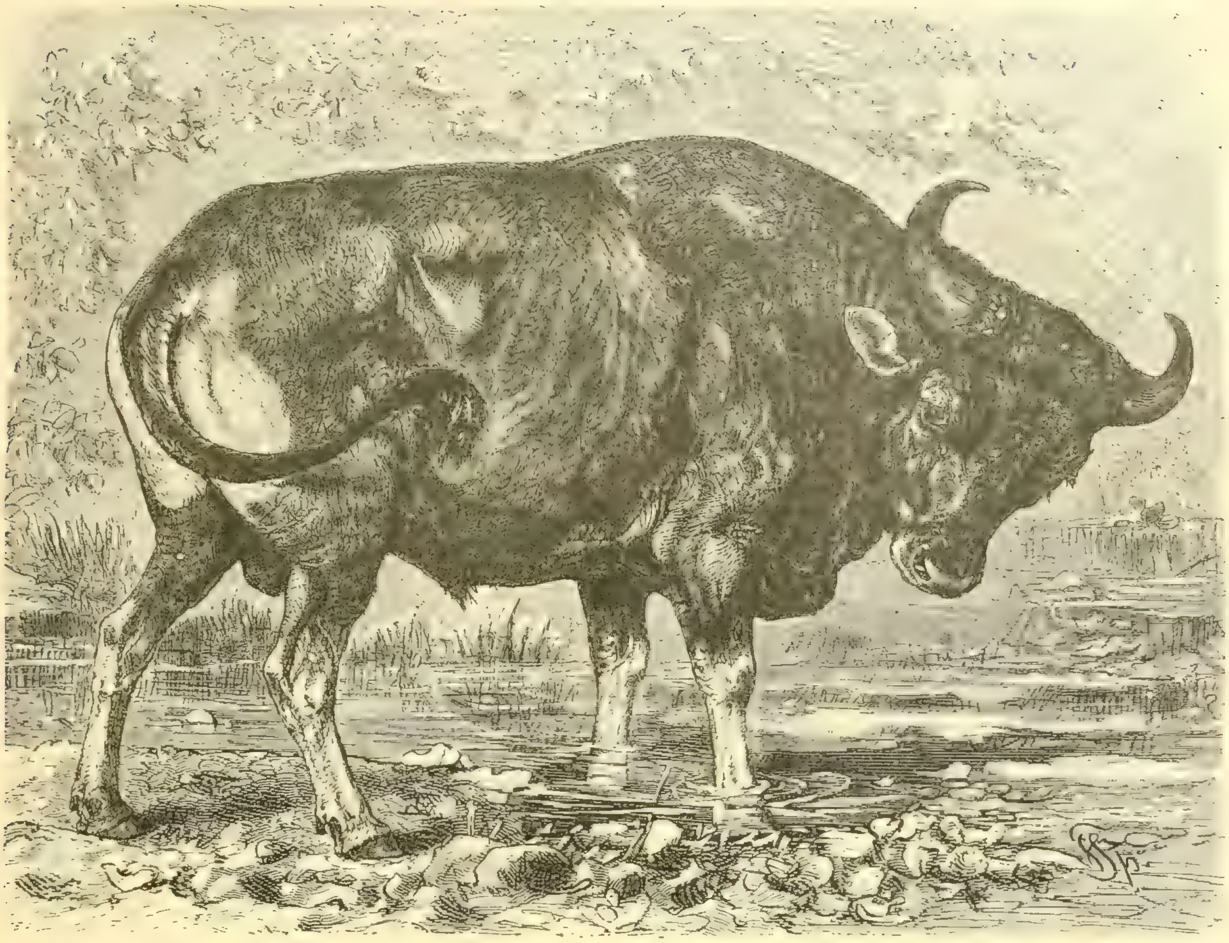
ON taking a retrospective view of the rodent animals, the reader will not fail to observe the frequency with which they reproduce some idea which is more fully manifested in other orders of the animal kingdom. The destructive idea is not more strongly developed in the lion than in the rat, which will attack and kill animals of much greater strength and bulk than itself. It is a truly bloodthirsty being, and will kill many a rabbit or fowl for the mere sake of sucking the hot blood as it pours from the fatal wound.

The tree-loving and agile squirrel plays the same part among the rodents as the monkey among the quadrumana; the flying squirrels have a close analogy to the colugo and the petaurists, and they again to the bats, which in their turn partake largely of the bird character and formation. The beaver and ondatra are evident reproductions of the aquatic idea, which is more thoroughly developed in the seals and whales, and is carried out to its greatest perfection in the fishes. The rodent capybara again, with its thick, coarse, bristly hair, heavy form, hoof-like claws, and water-loving propensities, is no indifferent representation of the pachydermatous water hog, which also may be looked upon as corresponding to the dugong and manatee. Lastly, the aspalacidæ, or rodent mole rats, are wonderfully similar to the true insectivorous moles, both in habit and formation of body.

In many instances this phenomenon is exhibited in the reverse order, the members of other groups exhibiting a tendency towards the rodent type. The aye-aye, for example, a quadrumanous animal, displays so strong a resemblance to the squirrels, that it was long ranked together with those animals by systematic naturalists. The hyrax again, or klip-daas, a pachydermatous animal, and allied closely to the hippopotamus, is externally, and even in the arrangement of its teeth, so rabbit-like in form, that it was as a matter of course placed among the rodents, until Cuvier's accurate eye discovered its true character. The insect-eating tupaias of Java, with their arboreal habits and long bushy tails, are so like the squirrels that the popular name of a squirrel and a tupaia is identical in the countries where they reside.

All external objects are, in their truest sense, visible embodiments or incarnations of Divine ideas which are roughly sculptured in the hard granite that underlies the living and breathing surface of the world above; pencilled in delicate tracery upon each bark flake that encompasses the tree-trunk, each leaf that trembles in the breeze, each petal that fills the air with fragrant effluence; assuming a living and breathing existence in the rhythmic throbbings of the heart-pulse that urges the life-stream through the body of every animated being; and attaining their greatest perfection in Man, who is thereby bound, by the very fact of his existence, to outspeak and outact the Divine ideas, which are the true instincts of humanity, before they are crushed or paralyzed by outward circumstances. Only thus can man be truly the image and likeness of God, only thus can the Divine ideas be truly manifested in him to the world. For just in proportion as he shrinks from speaking the truth that is in him, or from acting the good that is in him, so far he stifles the commencing outbirth of Divine power, and becomes less and less godlike.

Hence the necessity for the infinitely varied forms of animal life. Until man has learned to realize his own microcosmal being, and will himself develop and manifest the god-thoughts that are continually inbreathed into his very essential nature, it needs that the creative ideas should be incarnated and embodied in every possible form, so that they may retain a living existence upon earth.



THE BANTING.—*Bibos banting.*

CATTLE, SHEEP, ETC.

OXEN.

IN the large and important group of animals which now occupy our attention, the incisor teeth are entirely absent in the upper jaw, and are eight in number in the lower. There are six molars on each side of each jaw. The two middle toes of each foot are separate, and are furnished with hoofs instead of claws. From the frontal bones proceed two excrescences, which are generally armed with horns, particularly in the male animal. The structure of the stomach and gullet is very remarkable, and is employed in producing that peculiar action which is called "ruminating," or chewing the cud. Although the horns have in many varieties of domesticated Oxen been eradicated by a long course of careful management, they are always present in the wild species, and are permanently retained through life, instead of being annually shed like those of a deer. The peculiar characteristics of the bovine skull are so well shown in the engraving, that further description is needless.

The Oxen, or Bóvidæ, as they are called, from the Latin word Bos, or Ox, are extremely difficult of systematic arrangement, as it is not easy to select any particular characteristic on which to base the distinctions of genus and species. Some writers have founded their arrangement upon the hoofs, others upon the muzzle, others upon the direction of the horns, and others upon the structure of their bony nucleus. Mr. Gray, in his elaborate elucidation of the Bóvidæ, considers that the "form of the horns affords the most natural character for subdividing them into groups," and employs other characteristics, such as the position of the knee, the beard of the male, and the formation of the muzzle, as means for further subdivision.

THE DOMESTIC OX of Europe has been so modified in form, habits, and dimensions, by its long intercourse with mankind, that it has developed into as many permanent varieties as the dog, the pigeon, or the rabbit, and would in many cases be thought to belong to different species. Among the principal varieties of this animal may be noticed the Long Horned, the Short Horned, and the Polled or hornless breeds, and the Alderney cow, so celebrated for the quantity and quality of the milk which it daily furnishes. In almost every part of the world are found examples of the Ox, variously modified in order to suit the peculiar circumstances amid which they are placed, but in all instances they are susceptible of domestication, and are employed in the service of mankind.

There are few animals which are more thoroughly useful to man than the Ox, or whose loss we should feel more deeply in the privation of so many comforts. Putting aside the two obvious benefits of its flesh and its milk—both of which are so needful for our comfort that we almost forget to think about them at all—we derive very great benefit from its powers while living, and from many portions of its body when dead.

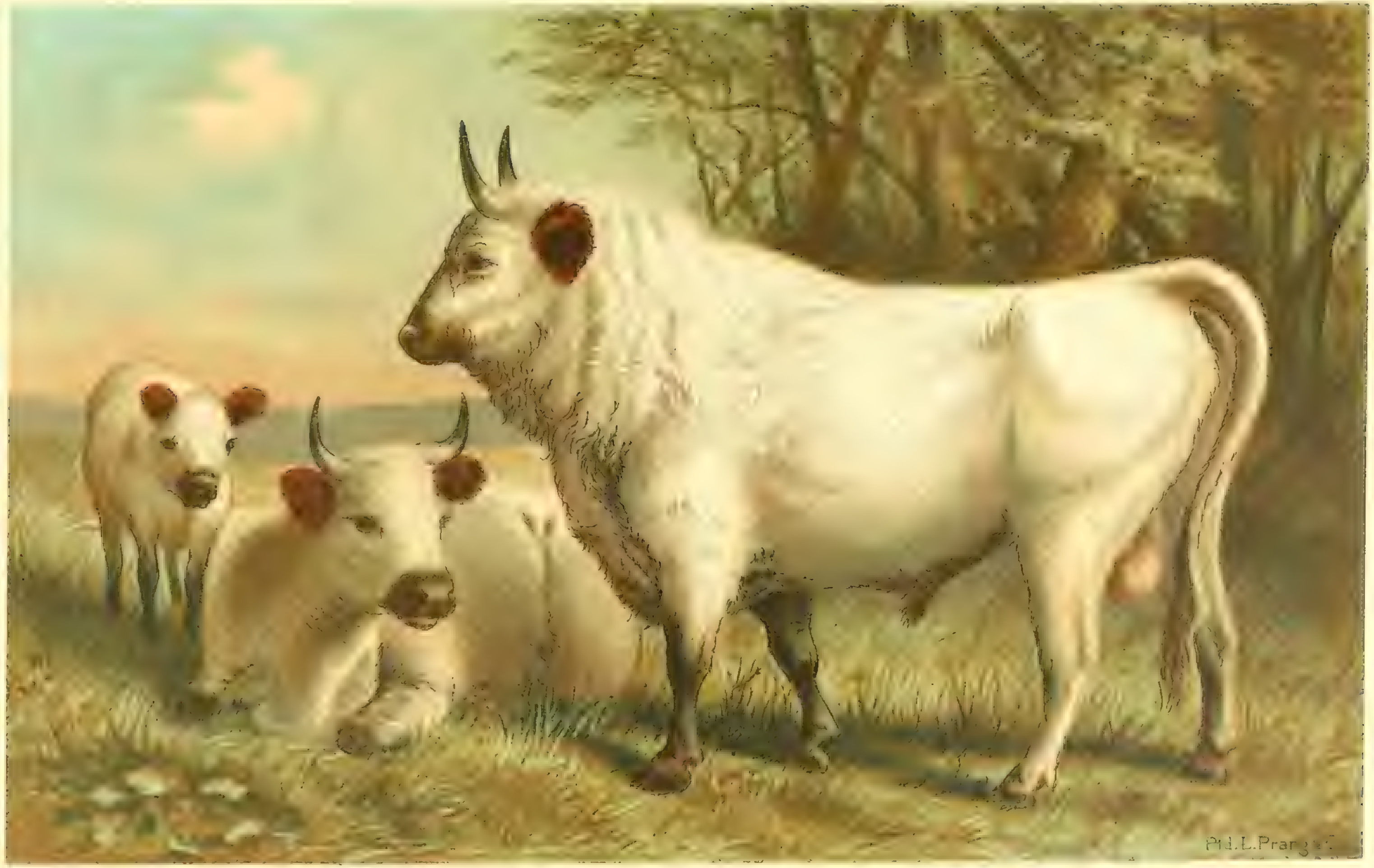
SKULL OF OX.

In many parts of Europe Oxen are still employed in agricultural labor, drawing the plough or the wagon with a slow but steady plodding gait. The carpenter would find himself sadly at a loss were his supply of glue to be suddenly checked by the disappearance of the animal, from whose hoofs, ears, and hide-parings the greater part of that useful material is manufactured. The harness-maker, carriage-builder, and shoemaker would in that case be deprived of a most valuable article in their trade; the cutler and ivory turner would lose a considerable portion of the rough material upon which they work; the builder would find his best mortar sadly impaired without a proper admixture of cow's hair; and the practical chemist would be greatly at a loss for some of his most valuable productions if the entire Ox tribe were swept from the earth. Not even the very intestines are allowed to be wasted, but are employed for a variety of purposes, and in a variety of trades. Sometimes the bones are subjected to a process which extracts every nutritious particle out of them, and even in that case, the remaining innutritious portions of the bones are made useful by being calcined, and manufactured into the animal charcoal which has lately been so largely employed in many of the arts and sciences.

THE best living example of the original British Ox is to be found in the celebrated WHITE CATTLE OF CHILLINGHAM. The beautiful oleograph representing these cattle is remarkably true to nature.

The color of these beautiful animals is a cream-white, with the exception of the ears and muzzle, the former of which are red, and the latter is black. Mr. Bell observes, that in every case of white cattle which have passed under his personal notice, the ears are marked with red or black, according to the breed. The white tint extends even to the horns, which are, however, tipped with black. They are rather slender in their make, and curve boldly upwards.

As these Chillingham cattle are permitted to range at will through spacious parks in which they are kept, they retain many of the wild habits of their tribe, and are so impatient of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CHILLINGHAM CATTLE.

observation that a stranger will generally find himself in a very unsafe position if he attempts to approach closely to the herd.

When they are alarmed or provoked at the intrusion of a strange human being within the limit of their territories, they toss their heads wildly in the air, paw the ground, and steadfastly regard the object of their dislike. If he should make a sudden movement, they scamper away precipitately, gallop round him in a circle, and come to another halt at a shorter distance. This process is continually repeated, the diameter of the circle being shortened at every fresh start, until the angry, yet half-frightened, animals, come so alarmingly close to the spectator, that he finds himself obliged to escape as he best can.

In performing these curious evolutions, they seem to be inspired by a mixture of curiosity, timidity, and irritation, which may be observed even in ordinary domestic cattle under similar circumstances.

On one occasion, when a herd of cattle were pressing upon me in a most uncomfortable manner, I owed my escape to early instruction in the art of the "acrobat." The herd, wholly composed of cows, was surrounding me with a very threatening aspect, and was advancing in such a manner that there was no mode of escape from their ranks. Seeing that a bold stratagem was the only resource, I ran sharply forward, and commenced rotating towards them in that peculiar method which is technically termed "turning a wheel," *i. e.* executing a series of somersaults on the hands and feet alternately. The cows were so terrified at the unknown foe who was attacking them in so extraordinary a manner, that they were panic-stricken, and galloped off at full speed, leaving me an easy escape before they had recovered from their surprise.

The Domestic Cow is too well known to need any detailed description of form and color. Few persons, however, except those who have been personally conversant with these animals, have any idea of their intelligent and affectionate natures.

They are possessed of very susceptible feelings, and are remarkably sensitive to insulting or disrespectful conduct on the part of their inferiors. In a herd of cows, the senior animal is the leader in all things, and maintains a strict authority over her younger companions. Not a single member of the herd dares to leave or to enter the pasture until the leader has led the way, or even to take its food until she has decided whether she will take possession of the banquet, or permit her inferiors to eat at peace. Should a younger animal commit a breach of etiquette by infringing any of the tacit rules which have been in force throughout Cowdom from time immemorial, the delinquent is butted at and punished until it returns to its allegiance.

To watch a calf through its various phases of existence is a most amusing employment. When the young animal is introduced for the first time into the farm-yard, she is treated in the most supercilious manner by the previous occupants, who look with an air of supreme contempt upon the new comer. She is pushed aside by all her predecessors, and soon learns to follow humbly in the wake of her companions. She cannot even venture to take possession of a food-rack until all the others have begun their meal. So matters go on for a time, until she has attained a larger growth, and a younger calf is turned into the yard. She now in her turn plays the tyrant over the new comer, and receives no small accession of dignity from the fact of having a follower, instead of bringing up the rear in her own person. In process of time she makes her way to the head of the yard by virtue of seniority, and is then happy in the supreme rule which she enjoys.

Sometimes a three-parts grown heifer is introduced into a farm-yard, and in that case, the new comer refuses to take her place below all the others, unless she is absolutely compelled to do so by main force. There is generally a considerable amount of fighting before such an animal finds her level, but when she has discovered her superiors and her subordinates, she quietly settles down in her place, and does not attempt to rise otherwise than by legitimate seniority.

As the Oxen, in common with the sheep, camels, giraffe, and deer, require a large amount of vegetable food, and are, while in their native regions, subject to innumerable disturbing causes that would effectually prevent them from satisfying their hunger in an ordinary manner, they are furnished with a peculiar arrangement of the stomach and digestive organs, by means of which they are enabled to gather hastily a large amount of food in any spot where the vegetation is luxuriant, and to postpone the business of mastication and digestion to a time when they may be less likely to be disturbed. The peculiarity of structure lies chiefly in the stomach and gullet, which are formed so as to act as an internal food-pouch, analogous in its use to the cheek-pouches of certain monkeys and rodents, together with an arrangement for regurgitating the food into the mouth at the will of the animal, previous to its mastication and digestion.

Owing to the absence of teeth in the upper jaw, the Ox is unable to cut or chew the grass as he feeds, and can only seize it between the lower incisor teeth and the upper jaw, so as to tear it by a movement of the head. The sound which is produced by this ripping or tearing process is famaliar to all who have watched cows while grazing. As soon as the grass is taken into the mouth, it undergoes a slight rolling between the molar teeth, and is then swallowed, although it is not as yet in a fit state to be placed in the stomach, and there to be digested. The mode in which it undergoes that process is as follows:

The stomach and gullet are modified into four distinct compartments, one of which, called the paunch, is very much larger than the others, and is the receptacle into which the food is passed immediately after being swallowed. Here it remains comparatively unchanged until the animal is at rest, and ready to commence the process which is technically called "ruminating," and more popularly termed "chewing the cud." A small portion of the food then passes into the second compartment, which is lined with a series of hexagonal cells, not unlike the comb of the honey-bee, and is formed into little balls by being worked into the cells. From these cells the food is thrown into the mouth by a voluntary effort of the muscles, and is then subjected to a thorough mastication. Being again swallowed, it slips over the opening by which it had formerly passed into the paunch, and is received into the third compartment, technically called the "psalterium," or psalm-book, because it is lined with a number of thin longitudinal plates of membrane, which are thought to bear some resemblance to the leaves of a book. From thence it passes into the fourth compartment, which is the place where the business of digestion is carried on.

These different compartments of the stomach are familiar under the general name of tripe, and are popularly distinguished from each other as follows:

The first compartment is called the paunch, and is lined with a vast number of little flattened projections of the membrane. In the paunch, are found those curious concretions of hair and other substances which are known as hair-balls or bezoar stones.

The hair-balls are of various dimensions, a collection of them in my own possession varying from the size of a very large cricket-ball to a moderately-sized marble. The hair is arranged most regularly in these balls, and all lies in the same direction, so that the axis on which the ball has revolved is plainly marked by the arrangement of the hair. In some of the balls the surface is covered with hair of different colors, some specimens being of a dark tint, while others are pure white. If the hair-ball be divided, its substance will be found to be of a spongy texture, affording considerable resistance to the knife, and requiring a strong and sharp blade to cut it neatly. Together with the hair is found a slight admixture of vegetable fibre. When first removed from the animal, these balls are wet and soft, receiving the impressions of the fingers unless handled with some care, but when they are quite dry, they are extremely light, hard, and strong, and tolerably elastic. Sometimes they are smooth on the exterior, which is then of a deep brown hue, and rather highly polished.

The second compartment is popularly called the "honeycomb," the "bag," or the "bonnet," and the third is termed the "monyplies," or "manyplus," on account of the membranous folds with which its interior is lined.

The last stomach is generally termed the "red."

In scientific language, the first compartment is called the "rumen," from which word is derived the term "ruminating;" the second is known under the name of "reticulum," or net; the third is called "omasus," or "psalterium;" and the fourth is called the "abomasus," because it leads from the third compartment, or omasus.

Although the process of ruminating is mostly confined to the Ox and the other animals whose names have been already mentioned, it has, in more than one instance, been discovered in human beings.

In many parts of the world, such as the Pampas of America and the Australian colonies, vast herds of cattle roam the country as freely as if they were the original inhabitants. Although they are all sprung from domesticated cattle which have been permitted to run wild or have escaped from their owners, they have returned to the habits as well as the conditions of savage life, and can only be brought temporarily within the subjection of man by actual force.

However free and uncurbed they may be, they are all private property, and except when of very tender age, are all branded with the name of their owner burnt deeply into the skin. In detaching the unmarked cattle from the remainder of the herd, and bringing them safe to the enclosure where they are to receive the distinguishing brand of their proprietor, the cattle-drivers exhibit an extraordinary mixture of excellent horsemanship, great dexterity, cool patience, and fearless daring. Yet the man is sure to triumph over the beast at last, however cunning or powerful it may be, and before the poor animal has quite recovered from his surprise at finding himself mastered for the first time in his life, he has been captured, tied, branded, and set free again.

In Africa, the cattle are not only employed for the yoke, but are also educated for the saddle, and are taught to obey the bit as well as many horses. The bit is of very primitive form, being nothing more than a stick which is passed through the nostrils, and to which the reins are tied. One end of the stick is generally forked to prevent it from falling out of its place, and in guiding the animal, the rider is obliged to draw both reins to the right or left side, lest he should pull out the wooden bit.

The Saddle Oxen of Africa are not very swift steeds, their pace being about four or five miles an hour; and as their skin is so loosely placed on their bodies that the saddle sways at every step, their rider has no very agreeable seat. In training the Ox for the saddle, the teachers avail themselves of the aid of two trained Oxen, between which the novice is tied, and which soon teach it the proper lesson of obedience.

The horns of this variety of the Ox are of marvellous length, having been known to exceed thirteen feet in total length, and nearly nine feet from tip to tip. The circumference of these enormous horns was more than eighteen inches, measured at their bases. One such horn is capable of containing upwards of twenty imperial pints. These weapons are not only long, but are sharply pointed, and are of so formidable a nature that a lion has been kept at bay during a whole night, not daring to leap upon an animal so well defended. As these horns might prove dangerous to the rider in case of the animal suddenly jerking its head, or flinging him forward by a stumble, the natives are in the habit of training them in various fashionable modes, by which the danger is avoided. Sometimes the horns are split into numerous ribbons, and curled fantastically in various directions; sometimes they are merely bent forwards and downwards; but the method most in vogue is to cause them to swing loosely at each side of the head, their points towards the earth, and out of the way of the rider.

It is a remarkable fact that this Ox is in the habit of chewing dry bones whenever it finds them lying on the ground. The caribou, or American reindeer, is known to gnaw the fallen antlers of its companions, and probably with the same object.

Should the Ox turn out to be of a peculiarly savage disposition, he is soon conquered by having a heavy iron chain fastened round his neck. The continual weight which he is forced to carry whenever he moves, together with the jingling of the iron links, has such an effect upon his spirits, that he is forced to yield after a few days' trial. It is said that if the Ox is forced into the long grass which grows so luxuriantly in Southern Africa, it becomes alarmed, because it feels itself unable to see an approaching enemy, and is even terrified at the proximity of its own companions.

It is worthy of remark in the present place, that the skin of a white Ox is considered by the native tribes as an emblem of peace, and is analogous to the white bison hide which is displayed by our Indians for similar purposes.

The Ox is also employed for draft in Southern Africa, and is used chiefly for the purpose of drawing the wagons over the tracks which are by courtesy called roads. Although the wagons are remarkably light, and are built in such a manner as to take no harm by an occasional upset, the ground is so heavy and the wheels sink so deeply, that a very large team of these cattle is required to draw the vehicle safely on its journey. Eight or ten yoke of oxen are frequently employed in drawing a single wagon. The conduct of the native drivers towards these poor beasts is cruel in the extreme, and deserving of the greatest reprobation. The "jambok," or whip, which these men employ is of very great length, and can be used with an effect that is perfectly terrible. Besides this more legitimate instrument, the Hottentot driver is in the habit of using various other methods of tormenting the poor beasts, and is absolutely ingenious in the refinements of his cruelty.

The Family *Bóvidæ* is not largely represented in America. One notable example is the American Bison (*Bison americanus*), a good figure of which is herein seen. Of this genus, *Bison*, but two species are known. The European Bison, or Aurochs, is nearly extinct. The Emperor of Russia has preserved a small herd during the last half century in Lithuania; all others have passed away. Remains of this species are found in alluvial deposits in all parts of Europe. By permission of the Emperor, M. Verreaux, of Paris, the eminent taxidermist, was allowed to procure one specimen for the American Museum of Natural History, in Central Park. This is the only one on this continent. It stands higher than the American Bison, and has less mane. The full-page illustration we give is quite correct.

The American Bison has for a long period been the ruling power of the plains. Its vast herds have been the wonder of visitors. Though yet seen in considerable numbers in some localities, there is a monstrous sacrifice of the creatures steadily going on; and some time in the near future they will be reduced to the condition of their allies in Europe. It is to be hoped that long before that happens the great Yellowstone Park may give friendly shelter to a goodly number for perpetual preservation. And this may be said of several other species of our indigenous animals. The beautiful deer, and graceful antelope; the wild and almost unapproachable mountain sheep, and mountain goat; these, too, should find permanent homes in this grand garden of Nature's wonders. What a scene is opened up to the mind's eye in contemplation of such a scheme! Serious efforts are being made, even now, to this very desirable end.

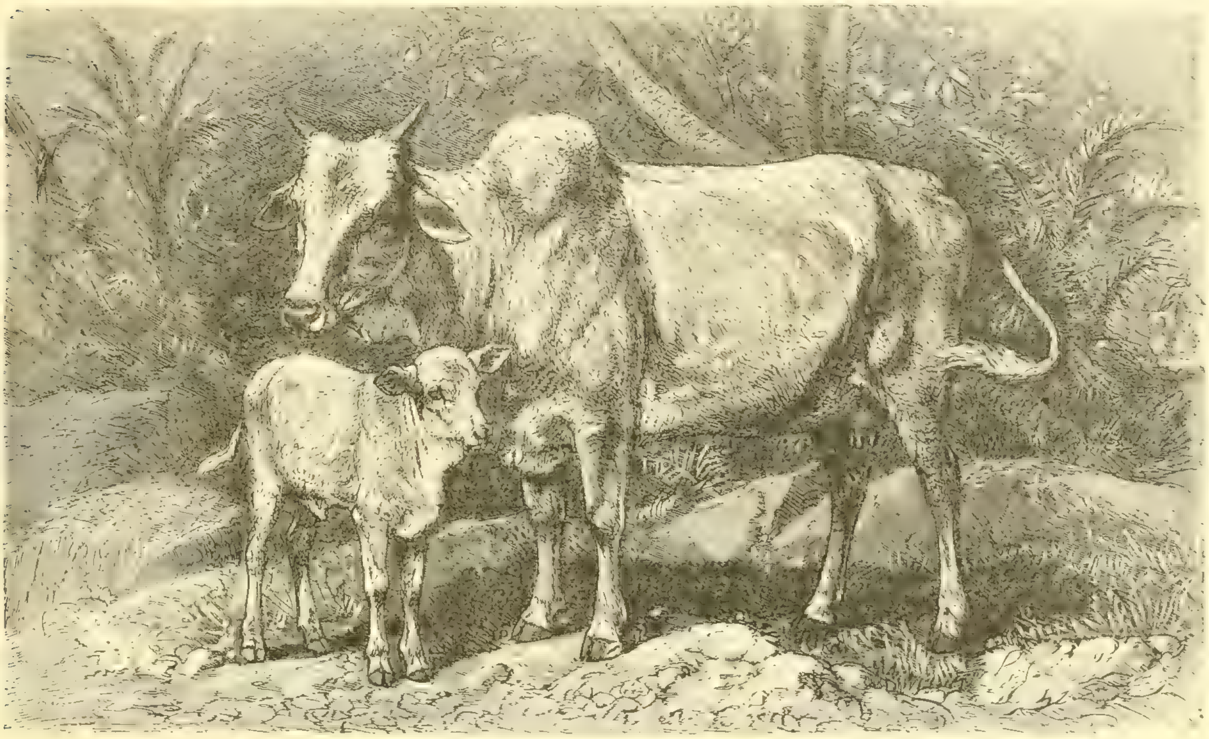
The Bison and the North American Indian are so related, it would seem that the decline of one must inevitably be followed by the discomfiture of the other—so long as the Indian is in a state of barbarism.

Audubon says: "In the days of our boyhood and youth, Bison roamed over the small and beautiful prairies of Indiana and Illinois. Herds of them stalked through the woods of Kentucky and Tennessee; but they had dwindled down to a few stragglers, which resorted to the barrens, towards the year 1808, and soon after entirely disappeared. They gradually tended westward, and now for many years none are seen east of the great rivers of the West."

Though huge and apparently clumsy, the Bison is exceedingly playful and frolicsome, gambolling as we see domestic cattle do. Mr. Audubon relates that a gentleman in Kentucky kept a herd of Bison over thirty years. They were as docile as other cattle; grazing with his domestic herd in the same field. The tame bull was unwilling to breed with the Bison cow, but the Bison bull produced a cross with the common cow. From the latter several half-breeds were raised, one being a heifer. These animals were larger than either parent when full grown. Audubon states that the Bison was formerly common in North and South Carolina.

THE domestic cattle of India is commonly known by the name of ZEBU, and is conspicuous for the curious fatty hump which projects from the withers. These animals are further remarkable for the heavy dewlap, which falls in thick folds from the throat, and which gives to the fore part of the animal a very characteristic aspect. The limbs are slender, and the back, after rising towards the haunches, falls suddenly at the tail.

The Zebu is a quiet and intelligent animal, and is capable of being trained in various modes for the service of mankind. It is a good draught animal, and is harnessed either to carriages or ploughs, which it can draw with great steadiness, though with but little speed. Sometimes it is used for riding, and is possessed of considerable endurance, being capable of carrying a rider for fifteen hours in a day, at an average rate of five or six miles per hour. The Nagore breed is specially celebrated for its capabilities as a steed, and is remarkable for its peculiarly excellent action. These animals are very active, and have been known to leap over a fence which was higher than our five-barred gates, merely for the purpose of drinking at a certain well, and, having slaked their thirst, to leap back again into their own pasture. As a beast of burden, the Zebu is in great request, for it can carry a heavy load for a very great distance, though at no great speed.



ZEBU.—*Bos indicus.*

The Zebu race has a very wide range of locality, being found in India, China, Madagascar, and the eastern coast of Africa. It is believed, however, that its native land is India, and that it must have been imported from thence into the other countries.

There are various breeds of Zebu, some being about the size of our ordinary cattle, and others varying in dimensions from a large Ox to a small Newfoundland dog. One of the most familiar of these varieties is the well-known Brahmin Bull, so called because it is considered to be sacred to Bramah.

The more religious among the Hindoos, scrupulously observant of the letter of a law which was intended to be universal in its application, but to which they give only a partial interpretation, indulge this animal in the most absurd manner. They place the sacred mark of Siva on its body, and permit it to wander about at its own sweet will, pampered by every luxury, and never opposed in any wish or caprice which it may form. A Brahmin Bull will walk along the street with a quaintly dignified air, inspect anything and anybody that may excite his curiosity, force every one to make way for himself, and if he should happen to take a fancy to the contents of a fruiterer's or greengrocer's shop, will deliberately make his choice and satisfy his wishes, none daring to cross him. The indulgence which is extended to this animal is carried to so great a height, that if a Brahmin Bull chooses to lie down in a narrow lane, no one can pass until he gets up of his own accord.

Bishop Heber, in his well-known journal, mentions the Brahmin Bulls and the unceremonious manner in which they conduct themselves, and remarks that they are sometimes rather mischievous as well as annoying, being apt to use their horns if their caprices be not immediately gratified.

The Buffalo is spread over a very wide range of country, being found in Southern Europe, North Africa, India, and a few other localities.

This animal is subject to considerable modifications in external aspect, according to the climate or the particular locality in which it resides, and has in consequence been mentioned under very different names. In all cases the wild animals are larger and more powerful than their domesticated relations, and in many instances the slightly different shape, and greater or lesser length of the horns, or the skin denuded of hairs, have been considered as sufficient evidences of separate species.

In India, the long, smooth-horned variety chiefly prevails, and is found in tolerable profusion. This animal frequents wet and marshy localities, being sometimes called the Water Buffalo on account of its aquatic predilections. It is a most fierce and dangerous animal, savage to a marvellous degree, and not hesitating to charge any animal that may arouse its ready ire. An angry Buffalo has been known to attack a tolerably-sized elephant, and by a vigorous charge in the ribs to prostrate its huge foe. Even the tiger is found to quail before the Buffalo, and displays the greatest uneasiness in its presence.

The Buffalo, indeed, seems to be animated by a rancorous hatred towards the tiger, and if it should come inadvertently on one of the brindled objects of its hate, will at once rush forward to the attack. Taking advantage of this peculiarity, the native princes are in the habit of amusing themselves with combats between tigers and trained Buffaloes. The arena is always prepared by the erection of a lofty and strongly-built palisade, composed of bamboos set perpendicularly, and bound together upon the outside. The object of this contrivance is, that the surface of the bamboo is so hard and slippery, that the tiger's claws can find no hold in case of an attempted escape.

The tiger is first turned into the arena, and generally slinks round its circumference, seeking for a mode of escape, and ever and anon looking up to the spectators, who are placed in galleries that overlook the scene of combat. When the tiger has crept to a safe distance from the door, the Buffalo is admitted, and on perceiving the scent of the tiger, it immediately becomes excited, its hairs bristle up, its eyes begin to flash, and it seeks on every side for the foe. As soon as it catches a glance of its enemy, it lowers its head towards the ground, so that the tips of its horns are only a few inches above the earth, and its nose lies between its fore-legs, and plunges forward at the shrinking tiger. Were the latter animal to dare the brunt of the Buffalo's charge, the first attack would probably be the last; but as the tiger is continually shifting its position, the force of the onset is greatly diminished by the curve in the Buffalo's course.

As a general rule the Buffalo comes off the victor, for even when the tiger has gained an advantage, he does not follow it up with sufficient celerity, but permits his antagonist to regain his lost breath. The Buffalo, on the contrary, allows the tiger no breathing time, but continues his rapid charges without cessation, until he forces the tiger off his guard, and then with a rapid spring impales the foe on his horns.

It is generally supposed that the wild Buffaloes will destroy any tigers that may happen to approach their herds too closely. A wild adult male Buffalo, or Arnee, as it is also called, is one of the largest of the Ox tribe, measuring no less than ten feet six inches from the tip of the nose to the root of the tail, and from six feet to six feet six inches in height at the shoulders. So confident are even the tiger-dreading herd-keepers of the prowess of their tamed animals, that they will ride them in search of pasture even when they know tigers to be in the near vicinity. One of these herds chanced to come across the spot where a tiger had been recently shot, and on perceiving the scent of the blood, they became powerfully excited,

Animate Creation.

WE have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the ANIMAL WORLD, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an ILLUSTRATED NATURAL HISTORY, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work—a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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N. E. **SELMAR HESS, Publisher, New York.**

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The late CHARLES DARWIN *writes*: "These illustrations are the best I ever saw in any work. I find it superfluous to enter here into particulars, as I already, in the 'Descent of Man,' have willingly and openly confessed how much I have profited by Mr. Brehm's book, and how highly I esteem it."

Sir JOHN LUBBOCK, Bart., D.C.L.: "You have, I think, done good service in publishing them. They are certainly very admirable."

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bellowed furiously, and at last charged in a body directly into a neighboring covert, crushing everything that impeded their progress.

The Arnee lives in large herds, arranged after the manner of all bovine animals, the females and young being always placed in the safest spots, while the males post themselves in all positions of danger. These herds are never seen on elevated ground, preferring the low, marshy districts where water and mud are abundant. In this mud they love to wallow, and when suddenly roused from their strange pastime, present a most terrible appearance, their eyes glaring fiercely from amid the mud-covered dripping masses of hair. Sometimes the Buffalo is said to fall a victim to its propensity for wallowing in the mud, and to be stuck so firmly in the oozy slime, as it dries under the scorching sunbeams of that burning climate, that it can be killed without danger. They generally chew the cud while they are lying immersed in mud or water.

Captain Williamson, in his work on "Oriental Field Sports," speaks thus of the Buffalo, and its mud-loving propensities :—

"This animal not only delights in the water, but will not thrive unless it have a swamp to wallow in. Then rolling themselves, they speedily work deep hollows, wherein they lie immersed. No place seems to delight the Buffalo more than the deep verdure on the confines of *jeels* and marshes, especially if surrounded by tall grass, so as to afford concealment and shade, while the body is covered by the water. In such situations they seem to enjoy a perfect ecstasy, having in general nothing above the surface but their eyes and nostrils, their horns being kept low down, and consequently hidden from view.

"Frequently nothing is perceptible but a few black lumps in the water, appearing like small clods, for the Buffaloes being often fast asleep, all is quiet ; and a passenger would hardly expect to see, as often happens, twenty or thirty great beasts suddenly rise. I have a thousand times been unexpectedly surprised in this manner by tame Buffaloes, and once or twice by wild ones. The latter are very dangerous, and the former are by no means to be considered as innocent. The banks of the Ganges abound with Buffaloes in their wild state, as does all the country where long grass and capacious *jeels* are to be found. Buffaloes swim very well, or, I may say, float. It is very common to see droves crossing the Ganges and other great rivers at all seasons, but especially when the waters are low. At a distance one would take them to be large pieces of rock or dark-colored wood, nothing appearing but their faces. It is no unusual thing for a boat to get into the thick of them, especially among reedy waters, or at the edges of jungles, before it is perceived. In this no danger exists ; the Buffaloes are perfectly passive, and easily avoid being run down, so the vessel runs no danger."

THE CAPE BUFFALO is quite as formidable an animal as its Indian relation, and much more terrible in outward aspect. The heavy bases of the horns, that nearly unite over the forehead, and under which the little fierce eyes twinkle with sullen rays, give to the creature's countenance an appearance of morose, lowering ill-temper, which is in perfect accordance with its real character.

Owing to the enormous heavy mass which is situated on the forehead, the Cape Buffalo does not see very well in a straight line, so that a man may sometimes cross the track of a Buffalo within a hundred yards, and not be seen by the animal, provided that he walks quietly, and does not attract attention by the sound of his footsteps. This animal is ever a dangerous neighbor, but when it leads a solitary life among the thickets and marshy places, it is a worse antagonist to a casual passenger than even the lion himself. In such a case, it has an unpleasant habit of remaining quietly in its lair until the unsuspecting traveller passes closely to its place of concealment, and then leaping suddenly upon him like some terrible monster of the waters, dripping with mud, and filled with rage. When it has succeeded in its attack, it first tosses the unhappy victim in the air, then kneels upon his body, in order to crush the life out of him, then butts at the corpse until it has given vent to its insane fury, and ends by licking the mangled limbs until it strips off the flesh with its rough tongue.

Many such tragical incidents have occurred, chiefly, it must be acknowledged, owing to the imprudence of the sufferer : and there are few coverts in South Africa which are not celebrated for some such terrible incident. Sometimes the animal is so recklessly furious in its unreasoning anger, that it absolutely blinds itself by its heedless rush through the formidable thorn-bushes which are so common in Southern Africa. Even when in company with others of their own species, they are liable to sudden bursts of emotion, and will rush blindly forward heedless of everything but the impulse that drives them forward. In one instance, the leader of the herd, being wounded, dropped on his knees, and was instantly crushed by the trampling hoofs of his comrades, as they rushed over the prostrate body of their chief.

In South Africa, the Cape Buffalo, called by the Kaffirs "Inyati," or "Inthumba," plays much the same part as the arnee in India. Like that animal, it does much as it pleases, and fears no enemy but armed men. Even the lion dare not approach too closely to a herd of Cape Buffaloes, for with the cunning old bulls in front, and the cows and calves bringing up the rear, the lion would have but a poor chance against a general charge of such foes. Indeed, even in single combat, the lion would scarcely come off the conqueror.

The Cape Buffalo, although so terrible an animal, is not so large as the arnee, being little larger than an ordinary ox, but possessed of much greater strength. The strangely shaped horns are black in color, and so large that the distance between their points is not unfrequently from four to five feet. On account of their great width at their bases, they form a kind of bony helmet, which is impenetrable to an ordinary musket-ball, and effectually defend their owner against the severe shocks which are frequently suffered by these testy animals.

I conclude this history of the Cape Buffalo with some personal reminiscences of the animal, which have been kindly placed at my disposal by Captain Drayson :—

"The hide of this animal is a bluish-black in color, and is so very tough that bullets will scarcely penetrate it if they are fired from a distance, or are not hardened by an addition of tin in the proportion of one to eight. It is of a fierce, vindictive disposition, and from its cunning habits is esteemed one of the most dangerous animals in Southern Africa. The Cape Buffalo is naturally a gregarious animal, but at certain seasons of the year the males fight for the mastery ; a clique of young bulls frequently turn out an old gentleman, who then seeks the most gloomy and retired localities in which to brood over his disappointments.

"These solitary skulkers are the most dangerous of their species ; and although it is the nature of all animals to fly from man, unless they are badly wounded, or are intruded upon at unseasonable hours, these old hermits will scarcely wait for such excuses, but will willingly meet the hunter half-way and try conclusions with him.

"Although frequently found in large herds on the plains, the Buffalo is principally a resident in the bush ; here he follows the paths of the elephant or rhinoceros, or makes a road for himself. During the evening, night, and early morning, he roams about the open country and gorges, but when the sun has risen high, or if he has cause for alarm, the glens and coverts are sought ; and amidst their shady branches he enjoys repose and obtains concealment. The 'spoor' of the Buffalo is like that of the common ox, the toes of the old bulls being very wide apart, whilst those of the young ones are close together ; the cow Buffalo's footprints are longer and thinner than the bull's, and smaller.

"As these animals wander in the open ground during the night, and retreat to their glens during the day, their spoor may be taken up from the outside of the bush, and followed until the scent leads to the view. When the hunter comes near to his game, of which he should be able to judge by the freshness of the footprints, he should wait and listen for some noise by which to discover their position. Buffaloes frequently twist and turn about in the bush, and do so more especially just before they rest for the day.

"I knew a Kaffir who carried about him the marks of a Buffalo's power and cunning. He was hunting Buffaloes one day in the bush, and came upon a solitary bull, which he wounded ; the bull bounded off, but the Kaffir, thinking him badly hurt, followed after at a run, without taking sufficient precautions in his advance. Now, dangerous as is a Buffalo when untouched, he is still more to be dreaded when hard hit, and should therefore be followed with the utmost caution.

"The Kaffir had hurried on through the bush for a hundred yards or so, and was looking for the spoor, when he heard a crash close to him, and before he could move himself, he was sent flying in the air by the charge of the Buffalo. He fell into some branches and was thus safe, for the Buffalo was not satisfied with this performance, but wished to finish the work which he had so ably begun. After examining the safe position of his victim, he retreated.

"The Kaffir, who had two or three ribs broken, reached his home with difficulty, and gave up Buffalo-shooting from that day.

"It appeared that this cunning animal had retraced its steps after retreating, and had then backed into a bush, and waited for the Kaffir to pass.

"A great sportsman at Natal, named Kirkman, told me that he was shooting Buffaloes when he was across the Sugela river on one occasion, and having wounded a bull, he was giving him his quietus, when the creature sent forth a sort of moan. Now the Buffalo always dies game, and rarely makes any other noise when hard hit. This moan was probably a signal; and as such it was translated by the herd to which this animal belonged, as they suddenly stopped in their retreat, and came to the rescue. Kirkman dropped his gun and took to some trees, where he was in safety. Fortunate it was for him that timber happened to be near, as the savage herd really meant mischief, and came round his tree in numbers. When they found that he was safe from their rage, they retreated.

"The vulnerable parts in a Buffalo are behind the shoulder, near the kidneys, or high up on the back. His head is so protected by his horny helmet, that a bullet does not easily find a vulnerable point in the forehead. I once met a Buffalo face to face in the bush—we were about three yards apart; I fired at his forehead, aiming between the eyes. I know that my bullet struck true; the Buffalo fell, but soon jumped up again, and scampered off. This was certainly a fair trial of lead versus horn, and horn had the best of it."

Another species of Buffalo is the Anoa, an inhabitant of the island of Celebes. This animal was formerly thought to belong rather more to the antelopes than to the oxen, but is now satisfactorily ascertained to be a member of the genus Bubalus. It is a small, but very fierce animal, and is with difficulty made prisoner. Some of these creatures, which were kept in confinement, killed in one night fourteen stags which were placed in the same inclosure. The horns of this animal are quite straight, and are set nearly in a line with the forehead. In length they equal the head, are boldly flattened in front, and are covered throughout their length with successive wrinklings. The Anoa is generally found among the more rocky localities of its native island.

The Banteng, or Javan Ox, possesses something of the homely aspect which belongs to the common domestic cattle. It is, however, a very strong, fleet, and active animal, inhabiting the wooded valleys of its native land, and living in small herds under the watchful guardianship of vigilant sentries.

This animal is rather variable in color, according to its age and sex, the old bulls being of a blackish-brown color, and the females a reddish-bay. Upon the hinder quarters is always a bold patch of white, the inside of the ears and the lips are of the same hue, and the lower half of the legs is white. It is a tolerably large animal, the height of an adult bull being about five feet six inches at the shoulder. In spite of its constitutional shyness and its dread of man, it is domesticated by the inhabitants of Borneo, and is employed for many useful purposes.

Largest of all the existing members of the Ox tribe is the Gaur, or Gour, an animal which may be easily recognized by the extraordinary elevation of the spinal ridge and the peculiarly white "stockings." The general color of the Gaur is a deep brown, verging here and there upon black, the females being usually paler than their mates. The dimensions of the Gaur are very considerable, a full-grown bull having been known to measure six feet ten inches in height at the shoulders. The great height of the shoulder is partly owing to the structure of the vertebræ, some of which give out projections of sixteen inches in length.

The Gaur associates in little herds of ten, twenty, or thirty in number, each herd generally consisting of a few males and a great comparative number of the opposite sex. These herds frequent the deepest recesses of the forest, and in their own domains bear supreme rule, neither tiger, rhinoceros, or elephant daring to attack them. During the heat of noonday, the Gaurs are buried in the thickest coverts, but in the early morning, and after the setting of the sun, they issue from their place of concealment, and go forth to pasture on the little patches of open verdure that are generally found even in the deepest forests. The watchfulness of this animal is extremely remarkable, as, independently of placing the usual sentries, the Gaurs are said to arrange themselves in a circle while at rest, their heads all diverging outwards, so as to preserve equal vigilance on every side. They may, however, be readily approached if the spectator be mounted on an elephant, as they seem to regard these huge animals without any suspicion or fear. In all probability, the imperturbable indifference with which they look upon the elephant is caused by the fact that the elephant is never used in Gaur-hunting, and, unless accompanied by human beings, never attempts to attack these animals.

The voice of the Gaur is rather peculiar, being totally different from the bellow of an ordinary bull or the lowing of a cow, and partaking greatly of the nature of a grunt, or hoarse cough. The breath of the Gaur is even sweeter than that of the domestic cow, and is plainly perceptible at a distance of several yards. The skin of this animal is extremely thick, especially on the shoulders and hinder quarters. The hide of these parts of the animal will sometimes measure nearly two inches in thickness when it has been removed from the Gaur, and permitted to contract during the process of drying. On account of its great strength, this portion of the skin is much esteemed for the purpose of being manufactured into shields. The flesh of the Gaur is said to be remarkably tender, and of good flavor.

To the Bisons belongs the AUROCHS, or BONASSUS, the former name being a corruption of the word Auer-Ochs. It is also commonly known by the name of *Zubr*. This animal is now almost, if not exclusively, confined to the forest of Bialowikza, in Lithuania, a locality which is peculiarly suitable to its habits, on account of the large marshy districts in which it abounds. In order that this magnificent animal may be preserved in perfection, it is protected by the most stringent forest laws. The Aurochs gives forth a powerful and curious odor, which is far from unpleasant, and partakes equally of the characters of musk and violet. This perfume is found to penetrate the whole of the body to a certain extent, but is exhaled most powerfully from the skin and hair which covers the upper part of the forehead. It is found in both sexes, but is much weaker in the cow than in her mate.

Although not so large as some of the preceding animals, standing only about six feet in height at the summit of the elevated shoulder, it is strongly and muscularly built, and is a terrible foe to any antagonist that may happen to arouse its ire. Like the buffalo, it has no fear of predaceous animals, a single Aurochs being supposed to be an overmatch for several hungry wolves. In general, it is shy, and fearful of the presence of man, slipping quietly away as soon as its acute senses perceive the symptoms of human neighborhood; but if wounded or irritated, it fights most desperately, using its short, sharply-pointed horns with terrible effect. In disposition it is said to be rather morose and untamable, never having been really domesticated and brought under the dominion of man, even when taken at a very early age.

It is a good swimmer, and is fond of dabbling in water, as well as of rolling itself in certain favored mud-holes which it frequents. For this reason, it is generally found in thickets which border upon marshy land, ponds, or streams, and in consequence causes all experienced travellers to be very cautious how they approach such localities. Its food is various vegetable substances, and it is especially fond of lichens. In spite of its heavy and awkward look, it is sufficiently active and swift, running with considerable speed for a short time, but being unable to prolong the course for many miles. While running, it carries its head very low, placing the nose almost between the fore-feet.

THE American BISON looks at first sight like an exaggeration of the aurochs, the hair of the body being thicker, more woolly, and more closely curled; the mane, which hangs

BISON.

over the head and shoulders, actually reaching the ground, and the entire aspect of the animal more lowering.

This creature is only found in Northern America, never appearing north of lat. 33°. It gathers together in enormous herds, consisting of many thousands in number, and in spite of the continual persecution to which it is subjected by man and beast, its multitudes are even now hardly diminished. The Bison is one of the most valuable of animals to the white hunter, as well as to the aboriginal Red Indian, as its body supplies him with almost every necessary of life.

The flesh of the fat cow Bison is in great repute, being juicy, tender, and well-savored, and possesses the invaluable quality of not cloying the appetite, even though it be eaten with the fierce hunger that is generated by a day's hunting. The fat is peculiarly excellent, and is said to bear some resemblance to the celebrated green fat of the turtle. The most delicate portion of the Bison is the flesh that composes the "hump," which gives to the animal's back so strange an aspect; and the hunters are so fond of this delicacy that they will often slay a magnificent Bison merely for the sake of the hump, the tongue, and the marrow-bones, leaving the remainder of the body to the wolves and birds. The pieces of hump-flesh that are stripped from the shoulders are technically called "fleeces," and sometimes weigh as much as a hundred pounds. The flesh of the Bison is also made of exceeding value to voyagers and travellers by being converted into "pemmican," a curious kind of preparation, which to the eye closely resembles tarred oakum, but which is composed of the dried fibres of Bison beef. "Jerked" beef is also made from this animal, the meat being cut into long thin strips, and hung in the sunshine until black, dry, and almost as hard as leather.

The hide is greatly valued both by Indians and civilized men, for the many purposes which it fulfils. From this hide the Indian makes his tents, many parts of his dress, his bed, and his shield. For nearly the whole of these uses the skin is deprived of hair, and is so dressed as to be impervious to water, and yet soft and pliable. The shield is very ingeniously made by pegging out the hide upon the ground with a multitude of little wooden skewers round its edge, imbuing it with a kind of glue, and gradually removing the pegs in proportion to the consequent shrinking and thickening of the skin. One of these shields, although still pliable, is sufficiently strong to resist an arrow, and will often turn a bullet that does not strike it fairly.

Sometimes the Bison is the means of saving the hunter from the terrible death of thirst, for it oftentimes happens that the prairie-men find themselves parched with thirst in the midst of vast plains, without a drop of water in their vessels, and no stream within a long day's journey. Under these circumstances, they would inevitably die, were it not that they know how to have recourse to certain natural fountains which are never entirely empty. The Bison has the power of taking a large amount of water into its body, and depositing it in the "reticulum," or cells of the honey-comb department of the stomach, until it shall be needed for use. The hunters, therefore, are not long at a loss for materials wherewith to quench their thirst as long as a Bison is in sight, but slay the animal at once for the sake of the water which they know will be found in the usual situation.

Vast quantities of Bisons are killed annually, whole herds being sometimes destroyed by the cunning of their human foes. The hunters, having discovered a herd of Bisons at no very great distance from one of the precipices which abound in the prairie-lands, quietly surround the doomed animals, and drive them ever nearer and nearer to the precipice. When they have come within half a mile or so of the edge, they suddenly dash towards the Bisons, shouting, firing, waving hats in the air, and using every means to terrify the intended victims. The Bisons are timid creatures, and easily take alarm, so that on being startled by the unexpected sights and sounds, they dash off, panic-struck, in the only direction left open to them, and which leads directly to the precipice. When the leaders arrive at the edge, they attempt to recoil, but they are so closely pressed upon by those behind them that they are carried forward and forced into the gulf below. Many hundreds of Bisons are thus destroyed in the space of a few minutes.

A much fairer and more sportsman-like method of hunting these animals is practised by red and white men, and consists in chasing the herds of Bisons and shooting them while at full speed. This sport requires good horsemanship, a trained steed, and a knowledge of the habits of the Bisons, as well as a true eye and steady hand. The hunter marks a single individual in the herd, and by skillful riding contrives to separate it from its companions. He then rides boldly alongside the flying animal, and shoots it from the saddle. In this method of shooting, the hunter requires no ramrod, as he contents himself with pouring some loose powder into the barrel, dropping a bullet from his mouth upon the powder, and firing across the saddle without even lifting the weapon to his shoulder. The Indians are very expert in this sport, and, furnished only with their little bows, will often give a better account of their day's sport than many a white hunter armed with the best firelock.

At certain seasons of the year, the whole Bison population becomes greatly excited about settling their matrimonial matters for the next twelvemonth, and dire are the quarrels among the bulls for favor in the eyes of their intended mates. Whole herds of these animals will run in a straight line for many miles, urged forward by some strange impulse, and being easily tracked, not only by the marks of their feet, which tear up the ground as if it had been ploughed, but by a succession of bull Bisons engaged in single combat, they having fallen out on the journey and halted to fight out their quarrel. A cloud of wolves always hangs about the skirts of these herds, as the cunning animals are well aware of the dangers that beset the infuriated wars of Bisons, and accompany them in hopes of pouncing upon some feeble or wounded straggler.

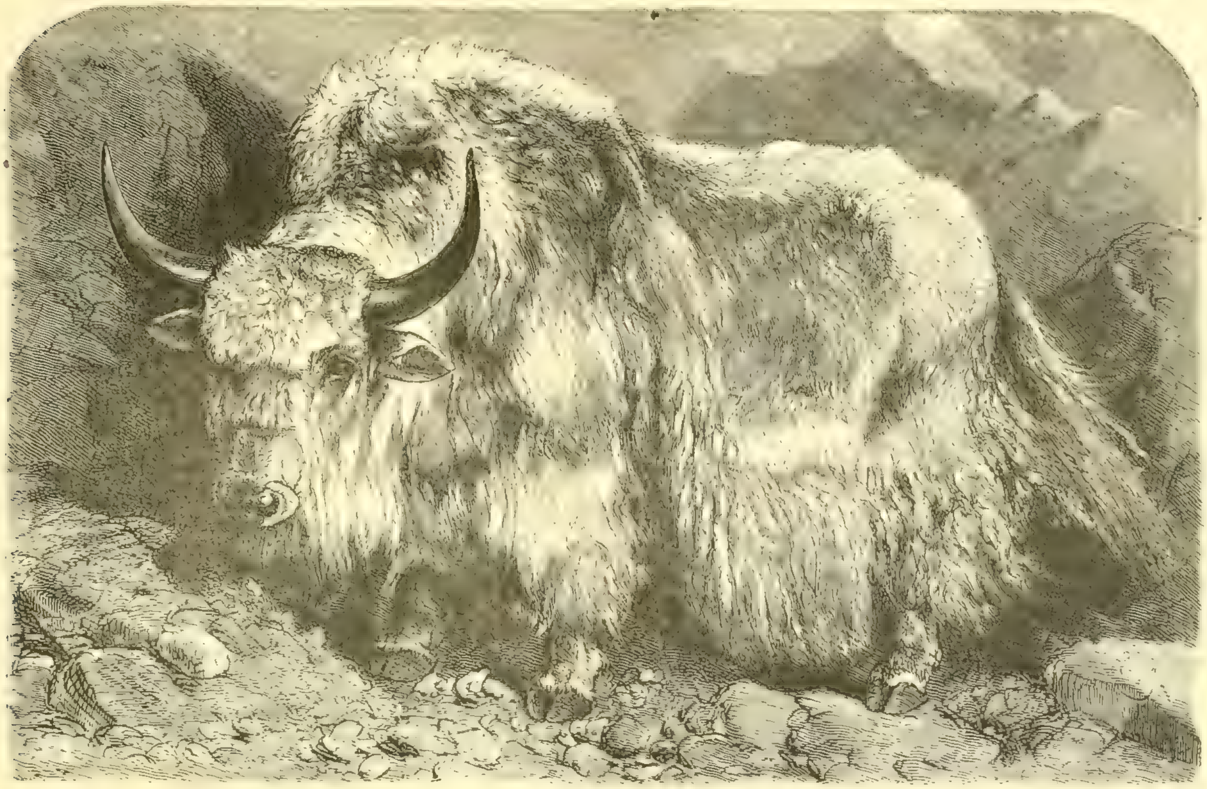
The Bison is remarkably fond of wallowing in the mud, and when he cannot find a mud-hole ready excavated, sets busily to work to make one for himself. Choosing some wet and marshy spot, he flings himself down on his side, and whirls round and round until he wears away the soil, and forms a circular and rather shallow pit, into which the water rapidly drains from the surrounding earth. He now redoubles his efforts, and in a very short time succeeds in covering himself with a thick coating of mud, which is probably of very great service in defending him from the stings of the gnats and other noxious insects which swarm in such localities.

In the summer, the Bison fares luxuriously, living on the sweet green herbage that always springs up after the prairie has been swept by the fires that are continually blazing in one part or another. In winter, however, it is often pinched with hunger as well as with cold, and would fare very badly, did it not instinctively employ its broad nose in shovelling away the snow and laying bare the grass that lies unhurt beneath the white covering. The nose of the Bison is admirably adapted for this purpose, being broad, strong, and tough, so that it can execute a work with ease which is most painful to ordinary cattle, and causes their noses to bleed sadly, from the unaccustomed friction. So severe, however, is the labor, that even old Bisons are often seen with their noses excoriated and bleeding from the effects of their toil. Mr. Palliser mentions that the common domesticated calves have been observed to hang about a Bison bull when he was engaged in shovelling away the snow, and to eat the herbage which he disclosed, without showing the least fear.

The Bison is a marvellously active animal, and displays powers of running and activity which would hardly be anticipated by one who had merely seen a stuffed specimen. The body is so loaded with hair that it appears to be of greater dimensions than is really the case, and seems out of all proportion to the slender legs that appear from under it and seem to bend beneath its weight. Yet the Bison is an enduring as well as a swift animal, and is also remarkably sure of foot, going at full speed over localities where a horse would be soon brought to a halt.

The Yak, or Grunting Ox, derives its name from its very peculiar voice, which sounds much like the grunt of a pig. It is a native of the mountains of Thibet, and, according to Hodson, it inhabits all the loftiest plateaus of High Asia, between the Altai and the Himalayas.

It is capable of domestication, and is liable to extensive permanent varieties, which have probably been occasioned by the climate in which it lives and the work to which it has been put. The Noble Yak, for example, is a large, handsome animal, holding its head proudly erect, having a large hump, extremely long hair, and a very bushy tail. It is a shy and withal capricious animal, too much disposed to kick with the hind feet and to make threatening demonstrations with the horns, as if it intended to impale the rider. The heavy fringes of hair that decorate the sides of the Yak do not make their appearance until the animal has attained three months of age, the calves being covered with rough curling hair, not unlike that of a black Newfoundland dog. The beautiful white bushy tail of the Yak is in great request for various ornamental purposes, and forms quite an important article of commerce.



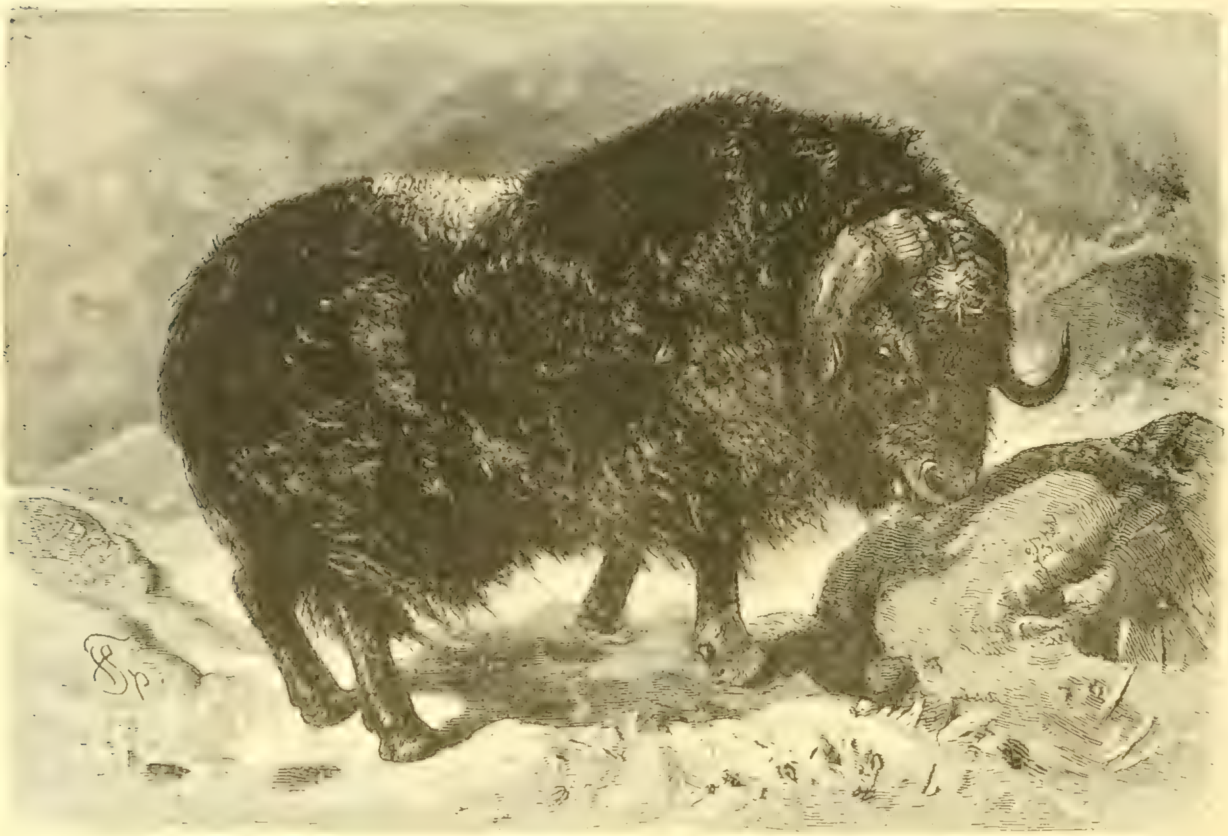
YAK.—*Bos grunniens.*

Dyed red, it is formed into those curious tufts that decorate the caps of the Chinese, and when properly mounted in a silver handle, it is used as a fly-flapper in India under the name of a chowrie. These tails are carried before certain officers of state, their number indicating his rank.

The Plough Yak is altogether a more plebeian-looking animal, humble of deportment, carrying its head low, and almost devoid of the magnificent tufts of long silken hairs that fringe the sides of its more aristocratic relation. Their legs are very short in proportion to their bodies, and they are generally tailless, that member having been cut off and sold by their avaricious owner. There is also another variety which is termed the Ghainorik. The color of this animal is black, the back and tail being often white. The natives of the country where the Yak lives are in the habit of crossing it with the common domestic cattle and obtaining a mixed breed. When overloaded, the Yak is accustomed to vent is displeasure by its loud, monotonic, melancholy grunting, which has been known to affect the nerves of unpractised riders to such an extent that they dismounted, after suffering half an hour's infliction of this most lugubrious chant, and performed the remainder of their journey on foot.

The curiously shaped horns of the Musk Ox, its long woolly hair falling nearly to the ground in every direction, so as nearly to conceal its legs, together with the peculiar form of the head and snout, are unfailing characteristics whereby it can be discriminated from any other animal. The horns of the Musk Ox are extremely large at their base, and form a kind of helmet upon the summit of the forehead. They then sweep boldly downwards, and are again hooked upwards towards the tips. This curious form of the horns is only noticed in the male, as the horns of the female are set very widely apart on the sides of the forehead, and are simply curved. The muzzle is covered with hair, with the exception of a very slight line round the nostrils.

This animal is an inhabitant of the extreme north of America, being seldom seen south of the sixty-first degree of latitude, and ascending as high as the seventy-fifth. It lives, in fact, in the same country which is inhabited by the Esquimaux, and is known to them under the name of Oomingnoak. It is a fleet and active animal, and traverses with such ease the rocky and precipitous ground on which it loves to dwell, that it cannot be overtaken by any pursuer less swift than an arrow or a bullet. It is rather an irritable animal, and becomes a dangerous foe to the hunters, by its habit of charging upon them while they are perplexed amid the cliffs and crevices of its rocky home, thus often escaping unharmed by the aid of its quick eye and agile limbs. The hunters say that it is rather a stupid animal in some matters, and that it will not run away at the report of a gun, provided that it does not see the man who fired it, or perceive the smell of the powder. They believe that the Musk Ox takes the flash and the report to be only a species of thunder and lightning, and therefore does not think itself obliged to escape. The flesh of this animal is very strongly perfumed with a musky odor, very variable in its amount and strength. Excepting, however, a few weeks in the year, it is perfectly fit for food, and is fat and well flavored.



MUSK OX.—*Ovibos moschatus.*

The Musk Ox is a little animal, but owing to the huge mass of woolly hair with which it is thickly covered, appears to be of considerable dimensions. The color of this animal is a yellowish-brown, deepening upon the sides.

Ovibos is a genus of sub-family *Caprinæ*, the latter embracing the Sheep, Goats and Musk Sheep.

The Musk Sheep (*Ovibos moschatus*) is usually called Musk Ox. As it is properly a sheep-like animal, we prefer to drop the inappropriate name. This is, perhaps, the most rare of North American animals. Though seen and killed in the Arctic Regions, it has been very difficult to get a perfect specimen for museums. After a long period of advertising and soliciting, Prof. Ward has just succeeded in procuring a specimen for the American Museum in Central Park.

Its specific name indicates that a peculiar odor like musk distinguishes it. Though clumsy in appearance it climbs rocky hills with the same ease as the goats and sheep. Its distribution in prehistoric days was over the whole European Continent—remains being found in the caves in widely distant portions.

GROUP OF SOUTH AFRICAN ANTELOPES.

ANTELOPES.

The Antelopes form a large and important group of animals, finding representatives in many portions of the globe. Resembling the deer in many respects, they are easily to be distinguished from those animals by the character of the horns, which are hollow at the base, set upon a solid core like those of the oxen, and are permanently retained throughout the life of the animal. Indeed, the Antelopes are allied very closely to the sheep and goats, and, in some instances, are very goat-like in external form. In all cases the Antelopes are light and elegant of body, their limbs are gracefully slender, and are furnished with small cloven hoofs. The tail is never of any great length, and in many species is very short. The horns, set above the eyebrows, are either simply conical or are bent so as to resemble the two horns of the ancient lyre, and are therefore termed "lyrate" in technical language.

THE well-known GAZELLE is found in great numbers in Northern Africa, where it lives in herds of considerable size, and is largely hunted by man and beast.

Trusting to its swift limbs for its safety, the Gazelle will seldom, if ever, attempt to resist a foe, unless it be actually driven to bay in some spot from whence it cannot escape; but prefers to flee across the sandy plains, in which it loves to dwell, with the marvellous speed for which it has long been proverbial. The herd seems to be actuated by a strong spirit of mutual attachment, which preserves its members from being isolated from their companions, and which, in many instances, is their only safeguard against the attacks of the smaller predaceous animals. The lion and leopard can always find a meal whenever they can steal upon a band of Gazelles without being discovered by the sentries which watch the neighborhood with jealous precaution, for the Gazelles are too weak to withstand the attack of such terrible assailants, and do not even attempt resistance.

GAZELLE.—*Gazella dorcas.*

If, however, the insidious foe is detected by the eye or scent of the sentinel, his chance of a dinner is hopeless for a while. The alarm is instantly given by the animal whose acute senses have discovered the near presence of the dreaded enemy, and the whole herd immediately take to flight, skimming over the ground with such wondrous rapidity that neither lion nor leopard would be able to overtake their flying steps.

When opposed by less formidable enemies, the Gazelles can bid defiance to their assailants by gathering themselves into a compact circular mass, the females and the young being placed in the centre, and the outer circle being composed of the males, all presenting their horns towards the intruder. They then form a dense phalanx of sharply pointed weapons, arranged on strictly military principles, and being the prototype of the spear-phalanx of ancient warfare, and the "square" of more modern tactics.

In this attitude the Gazelles will maintain their ground with considerable spirit and pertinacity, seeming to be entirely aware of the advantages which they derive from acting in concert, and oftentimes assuming the offensive as well as the defensive mode of action.

The eye of the Gazelle is large, soft, and lustrous, and has been long celebrated by the poets of its own land as the most flattering simile of a woman's eye. The color of this pretty little animal is a light fawn upon the back, deepening into dark brown in a wide band which edges the flanks, and forms a line of demarcation between the yellow-brown of the upper portions of the body and the pure white of the abdomen. The face is rather curiously marked with two stripes of contrasting colors, one a dark black-brown line that passes from the eye to the curves of the mouth, and the other a white streak that begins at the horns and extends as far as the muzzle. The hinder quarters, too, are marked with white, which is very perceptible when the animal is walking directly from the spectator.

THERE is considerable difficulty in assigning the Antelopes to their proper position in the animal kingdom, and in many instances zoologists are sadly bewildered in their endeavors to ascertain whether a certain animal is entitled to the rank of a separate species, or whether it can only be considered as a variety of some species already acknowledged. Such is the case with the **ARIEL GAZELLE**, an animal which is now determined to be merely a variety of the preceding animal, and not entitled to take rank as an independent species.

This beautiful little creature is very similar to the Dorcas Gazelle in general appearance, but is much darker in all its tintings, the back and upper portions of the body being a dark fawn and the stripe along the flanks almost black.

The Ariel is found in Syria and Arabia, and as it is not only a most graceful and elegant animal in appearance, but is also docile and gentle in temper, it is held in great estimation as a domestic pet, and may be frequently seen running about the houses at its own will. So exquisitely graceful are the movements of the Ariel Gazelle, and with such light activity does it traverse the ground, that it seems almost to set at defiance the laws of gravitation, and, like the fabled Camilla, to be able to tread the grass without bending a single green blade. When it is alarmed, and runs with its fullest speed, it lays its head back so that the nose projects forward, while the horns lie almost as far back as the shoulders, and then skims over the ground with such marvellous celerity that it seems rather to fly than to run, and cannot be overtaken even by the powerful, long-legged, and long-bodied greyhounds which are employed in the chase by the native hunters.

When the Gazelle is hunted for the sake of the sport, and not merely for the object of securing as many skins as possible, the falcon is called to the aid of the greyhound, for without such assistance no one could catch an Ariel in fair chase. As soon as the falcon is loosed from its jesses, it marks out its intended prey, and overpassing even the swift limbs by its swifter wings, speedily overtakes it, and swoops upon its head. Rising from the attack, it soars into the air for another swoop, and by repeated assaults bewilders the poor animal so completely that it falls an easy prey to the greyhound, which is trained to wait upon the falcon, and watch its flight.

When, however, the Gazelle is hunted merely for the sake of its flesh and skin, a very different mode is pursued.

Like all wild animals, the Gazelle is in the habit of marking out some especial stream or fountain, whither it resorts daily for the purpose of quenching its thirst. Near one of these watering-spots the hunters build a very large inclosure, sometimes nearly a mile and a half square, the walls of which are made of loose stones, and are too high even for the active Gazelle to surmount by means of its wonderful leaping powers. In several parts of the edifice the wall is only a few feet in height, and each of these gaps opens upon a deep trench or pit. The manner in which this enormous trap is employed is sufficiently obvious. A herd of Gazelles is quietly driven towards the inclosure, one side of which is left open, and being hemmed in by the line of hunters, the animals are forced to enter its fatal precincts. As the pursuers continue to press forward with shouts and all kinds of alarming noises, the Gazelles endeavor to escape by leaping over the walls, but can only do so at the gaps, and fall in consequence into the trenches that yawn to receive them. One after another falls into the pit, and in this manner they perish by hundreds at a time.

A very similar kind of trap, called the Hopo, is employed in Southern Africa, the walls of the inclosure being formed of trees and branches, and terminating in the pit of death. At the widest part the walls are about a mile asunder, and their length is about one mile. The pit at the extremity is guarded at its edges with tree-trunks, so as to prevent the sides from being broken down by the struggling animals in their endeavors to escape, and the plan is so successful, that sixty or seventy herd of large game are often captured in a single week.

The flesh of the Ariel Gazelle is highly valued, and is made an article of commerce as well as of immediate consumption by the captors. The hide is manufactured into a variety of useful articles. The Ariel is a small animal, measuring only about twenty-one inches in height at the shoulder. The Jairou, or common Gazelle of Asia, which is so celebrated by the Persian and other Oriental poets, is ascertained to be a different species from the Dorcas, and may be distinguished from that animal by the general dimness of the marking, and the dark brown streak on the haunches. It is also known by the name of Ahu, and Dsheren. Several other species are now known to belong to the genus Gazella, among which we may mention the Mohr of Western Africa, the Andra of Northern Africa, and the Korin, or Kevel, of Senegal. The latter animal possesses no tufts of hair upon the knees. There is one animal, the Chikara, or Ravine Deer of India, which is worthy of a passing notice, because it is by some authors supposed to belong to the Gazelles, and by others to form a separate genus, as is the case with the arrangement of the British Museum. This animal is also known under the titles of Chouka, Goat Antelope, and Kalsiepie, or Black-tail.

SPRING-BOK.—*Antilope euchore.*

The Spring-bok derives its very appropriate title from the extraordinary leaps which it is in the constant habit of making whenever it is alarmed.

As soon as it is frightened at any real or fancied danger, or whenever it desires to accelerate its pace suddenly, it leaps high into the air with a curiously easy movement, rising to a height of seven or eight feet without any difficulty, and being capable on occasions of reaching to a height of twelve or thirteen feet. When leaping, the back is greatly curved, and the creature presents a very curious aspect, owing to the sudden exhibition of the long white hairs that cover the croup, and are nearly hidden by a fold of skin when the creature is at rest, but which come boldly into view as soon as the protecting skin-fold is obliterated by the tension of the muscles that serve to propel the animal in its aërial course.

The Spring-bok is a marvellously timid animal, and will never cross a road if it can avoid the necessity. When it is forced to do so, it often compromises the difficulty by leaping over the spot which has been tainted by the foot of man. The color of the Spring-bok is very pleasing, the ground tinting being a warm cinnamon-brown upon the upper surface of the body, and pure white upon the abdomen, the two colors being separated from each other by a broad band of reddish-brown. The flesh of the Spring-bok is held in some estimation, and the hide is in great request for many useful purposes.

A VERY curious species of Antelopes is that which is scientifically known by the name of *Tetrăcerus quadricornus*, both words bearing the same signification, viz. "four-horned." These singular animals are natives of India, where they are known under the titles of CHOUSINGHA, or CHOUKA, the last word being derived from the native term *chouk*, a leap, which has been given to the animal in allusion to its habit of making lofty bounds.

The front pair of horns are very short, and are placed just above the eyes, the hinder pair being much longer, and occupying the usual position on the head. The females are hornless. The color of the Chousingha is a bright bay above and gray-white below, a few sandy hairs being intermixed with the white. The length of the hinder pair of horns is rather more than three inches, while the front, or spurious horns as they are sometimes termed, are only three-quarters of an inch long. The height of the adult animal is about twenty inches.

CHOUSINGHA, OR CHOUKA.—*Tetracerus quadricornis.*

THE DUYKER-BOK, or IMPOON, has derived its name of Duyker, or Diver, from its habit of diving suddenly, when alarmed, into the heavy brushwood among which it lives, and of disappearing from the sight of the hunter. For the following valuable account of the animal I am again indebted to Captain Drayson's MS. notes on the fauna of Southern Africa, which he has kindly placed at my disposal.

"On the borders of the bush, the Antelope which is most commonly met is the Duyker, a solitary and very cunning animal.

"If the sportsman should happen to overtake this buck, it will lie still, watching him attentively, and will not move until it is aware that it is observed. It will then jump up and start off, making a series of sharp turns and dives, sometimes over bushes, and at others through them. When it conceives that it is observed, it will crouch in the long grass or behind a bush, as though it were going to lie down. This conduct is, however, nothing but a ruse for the purpose of concealing its retreat, as it will then crawl along under the foliage for several yards, and when it has gone to some distance in this sly manner, will again bound away. It is therefore very difficult to follow the course of a Duyker, as it makes so many sharp turns and leaps, that both 'spoorer' and dogs are frequently baffled.

"If the course of the buck can be watched, and the place discovered where it lies down after its erratic manœuvrings, it can be easily stalked by approaching it from the leeward side. One must, however, be a good shot to secure a Duyker with certainty, for the little creature is so tenacious of life that it will carry off a large charge of buck-shot without any difficulty, and the irregular course which it then pursues requires great perfection and quickness in shooting with a single ball.

"The Duyker is not a very swift animal, and almost any ordinary dog can pull one down. An old pointer, which served me as a dog of all work, frequently caught and held a Duyker until I came to the death."

DUYKER-BOK.—*Cephalophus mergens.*

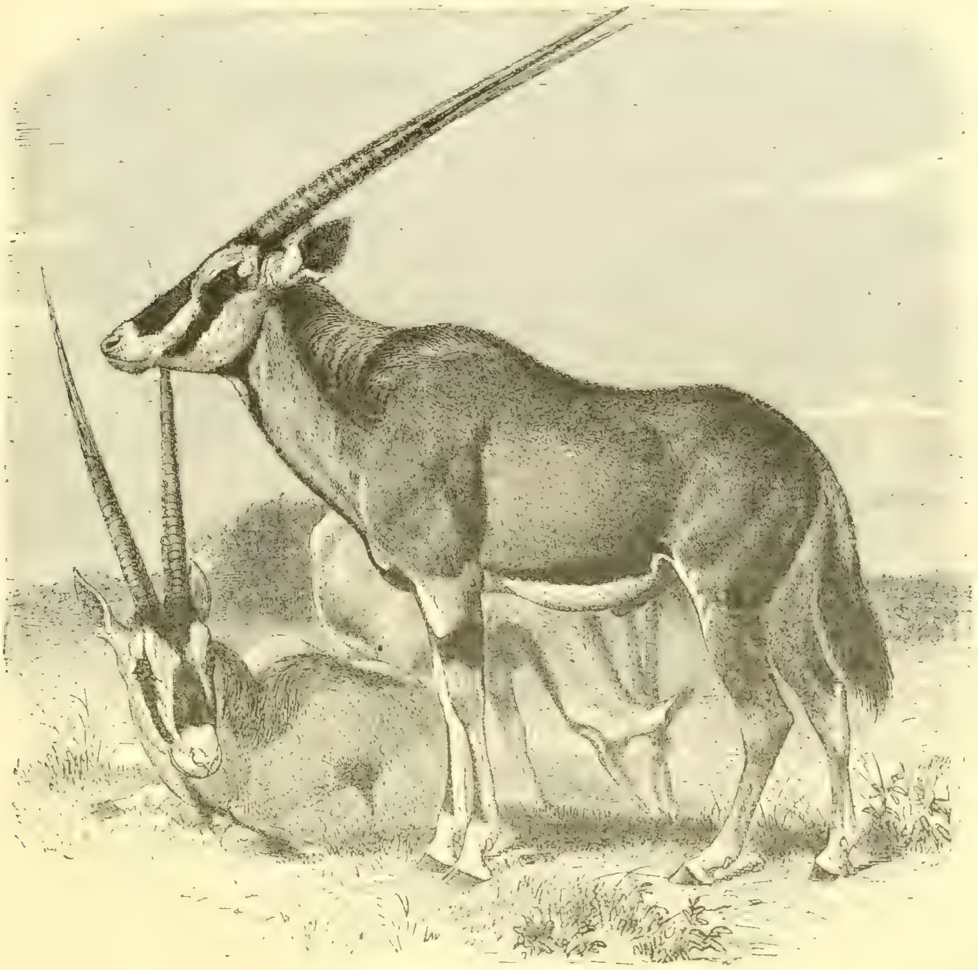
We now arrive at some remarkably handsome animals, which are notable, not only for their dimensions, but for the size and beauty of their horns. The Gems-bok, or Kookaam, is a large and powerful member of the Antelope tribe, equalling the domestic ass in size, and measuring about three feet ten inches at the shoulder. The peculiar manner in which the hide is decorated with boldly contrasted tints, gives it a very peculiar aspect. The general hue is gray, but along the back, upon the hinder quarters, and along the flanks, the color is deep black. A black streak also crosses the face, and passing under the chin, gives it the appearance of wearing harness. It has a short, erect mane, and long, sweeping, black tail, and its heavy horns are nearly straight from base to tip.

The long and sharply-pointed horns with which its head is armed, are terrible weapons of offence, and can be wielded with marvellous skill. Striking right and left with these natural bayonets, the adult Gems-bok is a match for most of the smaller carnivora, and has even been known to wage a successful duel with the lordly lion, and fairly to beat off its antagonist. Even when the lion has overcome the Gems-bok, the battle may sometimes be equally claimed by both sides, for in one instance, the dead bodies of a lion and a Gems-bok were found lying on the plain, the horns of the Antelope being driven so firmly into the lion's body, that they could not be extracted by the efforts of a single man. The lion had evidently sprung upon the Gems-bok, which had received its foe upon the points of its horns, and had sacrificed its own life in destroying that of its adversary.

In Captain Cumming's deservedly popular work on Southern Africa may be found the following notes concerning this animal.

"The Gems-bok was intended by nature to adorn the parched karroos and arid deserts of South Africa, for which description of country it is admirably adapted. It thrives and attains high condition in barren regions where it might be imagined that a locust could not find subsistence; and burning as is the climate, it is perfectly independent of water, which, from my own observation and the repeated reports both of Boers and aborigines, I am convinced it never by any chance tastes. Its flesh is deservedly esteemed, and ranks next to that of the eland. At certain seasons of the year they carry a great quantity of fat, at which time they can more easily be ridden into.

"Owing to the even nature of the ground which the Gems-bok frequents, its shy and suspicious disposition, and the extreme distance from water to which it must be followed, it is never stalked or driven to an ambush like the Antelopes, but is hunted on horseback and ridden down by a long, severe, tail-on-end chase. Of several animals in South Africa which are hunted in this manner, the Gems-bok is by far the swiftest and the most enduring."



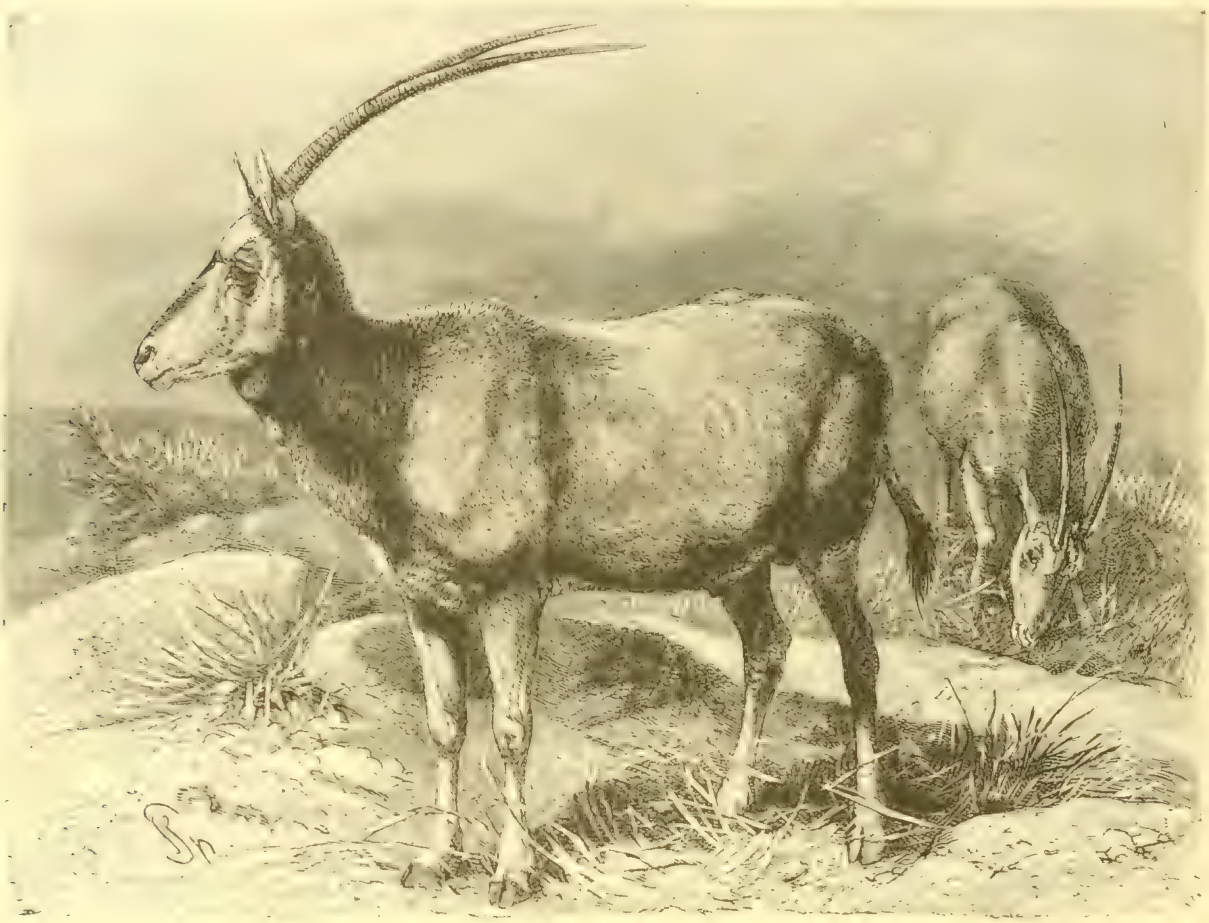
GEMS-BOK.—*Oryx gazella.*

Although the Gems-bok is nearly independent of water, it stands as much in need of moisture as any other animal, and would speedily perish in the arid deserts were it not directed by its instincts towards certain succulent plants which are placed in those regions, and which possess the useful power of attracting and retaining every particle of moisture which may happen to settle in their vicinity. The most common and most valuable of these plants is a bulbous root, belonging to the Liliacea, called, from its peculiar property of retaining the moisture, the Water-Root. Only a very small portion of the valuable plant appears above the ground, and the water-bearing bulb is so encrusted with hardened soil that it must be dug out with a knife. Several other succulent plants also possess similar qualities, among which may be noticed a kind of little melon which is spread over the whole of the great Kalahari desert.

Resembling the gems-bok in many particulars, the Oryx can be easily distinguished from its predecessor by the shape of the horns, which, instead of being nearly straight, are considerably bent, and sweep towards the back in a noble curve.

It uses these horns with as much address as its near relative the Gems-bok, and if it should be lying wounded on the ground, the hunter must beware of approaching the seemingly quiescent animal, lest it should suddenly strike at him with its long and keenly-pointed horns, while its body lies prostrate on the earth. Should it be standing at bay, it is a very dangerous opponent, having a habit of suddenly lowering its head and charging forward with a quick, lightning-like speed, from which its antagonist cannot escape without difficulty.

The color of this animal is grayish-white upon the greater part of its person, and is diversified by sundry bold markings of black and ruddy brown, which are spread over the head and body in a manner that can be readily comprehended from the illustration. The height of the Oryx is rather more than three feet six inches, and the long curved horns are upwards of three feet in length. These horns are set closely together upon the head, from whence they diverge gradually to their extremities. These weapons are covered with rings at their bases, but at their tips they are smooth and exceedingly sharp. Their color is black.

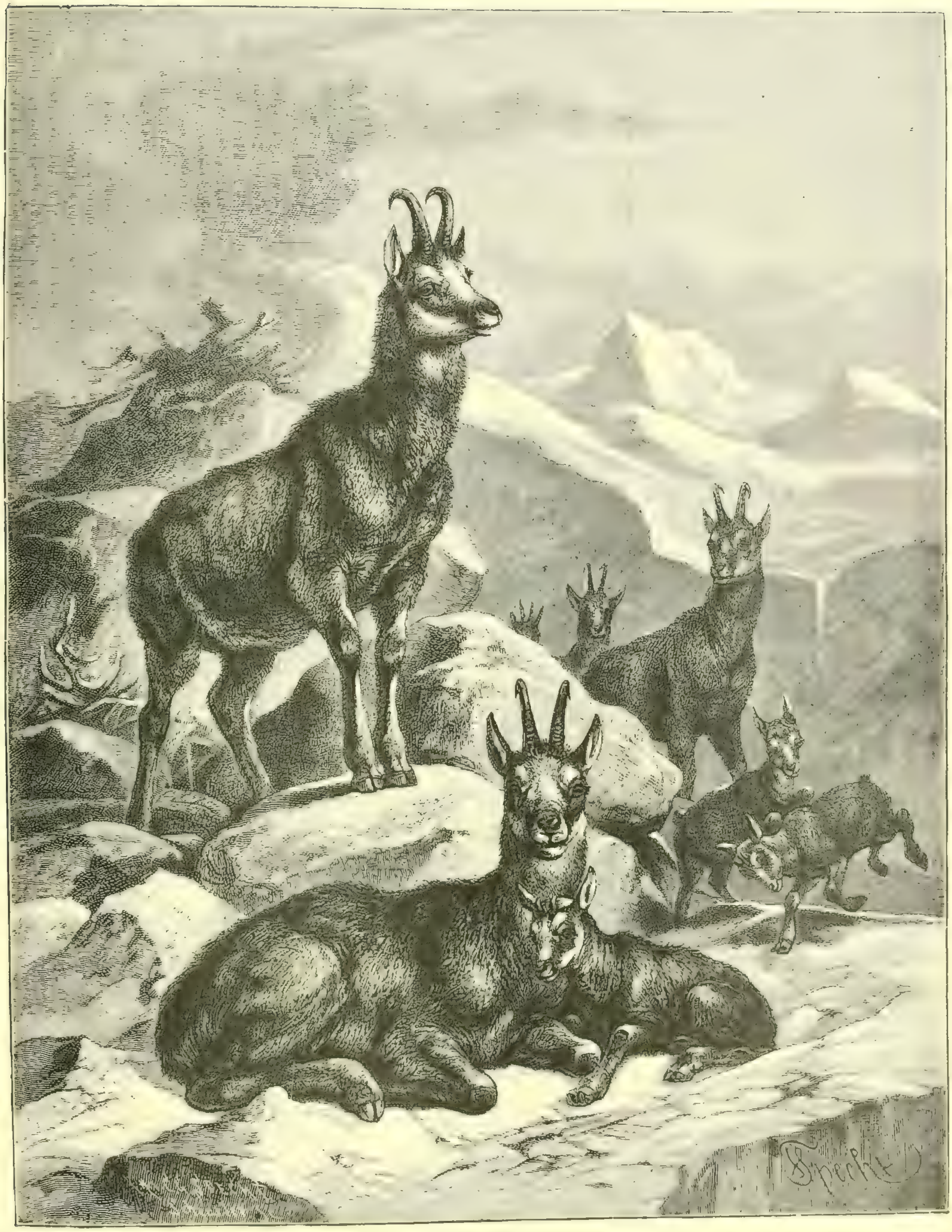


ORYX.—*Oryx leucoryx.*

The Oryx is a native of Northern Africa, where it is known under several names; such as Abou-Harb, El-Walrugh, El-Bukras, Ghau-Bahrein, or Jachmur. It lives in herds of considerable size, and feeds mostly on the branches and leaves of a species of acacia.

GOAT-LIKE in aspect, and very hircine in many of its habits, the CHAMOIS is often supposed to belong to the goats rather than to the Antelopes.

It is, however, a true Antelope, and may be readily distinguished from any of its relations by the peculiar form of the horns, which rise straight from the top of the head for some inches, and then suddenly curve backwards, so as to form a pair of sharp hooks. Formerly, this animal was reported to employ these ornaments in aiding itself to ascend or descend the frightful



CHAMOIS.

precipices on which it dwells. This opinion is, however, entirely erroneous, the horns being intended for the same mysterious purpose, which they serve when placed upon the head of the duyker, koodoo, or any other Antelope. In descending a precipitous rock, the Chamois is greatly aided by the false hoofs of the hinder feet, which it hitches upon every little irregularity in the stony surface, and which seem to retard its progress as it slides downwards, guided by the sharp hoofs of the fore-feet, which are placed closely together, and pushed well in advance of the body. Thus flattened against the rock, the Chamois slides downwards until it comes to a ledge broad enough to permit it to repose for a while before descending farther. In this manner the active creature will not hesitate to descend some twenty or thirty yards along the face of an almost perpendicular cliff, being sure to make good its footing on the first broad ledge that may present itself.

Although it is a very swift animal when upon level ground, and is unsurpassed in traversing the precipitous Alpine passes of its native home, it makes but a poor progress upon smooth ice, and in spite of its sharply-pointed hoofs, slips and slides about upon the glassy surface as awkwardly as any ordinary animal.

The Chamois is one of the most wary of Antelopes, and possesses the power of scenting mankind at an almost incredible distance. Even the old and half-obliterated footmarks which a man has made in the snow are sufficient to startle the sensitive senses of this animal, which has been observed to stop in mid career down a mountain side, and to bound away at right angles to its former course, merely because it had come across the track which had been left by the steps of some mountain traveller. Like all animals which live in herds, however small, they always depute one of their number to act as sentinel. They are not, however, entirely dependent on the vigilance of their picket, but are always on the alert to take alarm at the least suspicious scent, sight, or sound, and to communicate their fears to their comrades by a peculiar warning whistle. As soon as this sound is heard, the entire herd take to flight. It is worthy of notice, that the sentinel must possess the power, not only of announcing danger to its friends, but also of indicating the direction from which it comes. Facts of this nature, of which there are abundance on record, prove that although the sounds of animal voices appear to us to be without definite signification, they yet possess the capability of communicating ideas to others of the same species.

When their attention is aroused by anything suspicious, they have a habit of gazing fixedly in the direction of the object which has excited their alarm, and will remain still, as if carved out of the very rock on which they stand, halting in one fixed attitude for an almost incredible length of time.

Their ears are as acute as their nostrils, so that there are few animals which are more difficult of approach than the Chamois. Only those who have been trained to climb the giddy heights of the Alpine mountains, to traverse the most fearful precipices with a quiet pulse and steady head, to exist for days amid the terrible solitudes of ice, rock, and snow, and to sustain almost every imaginable hardship in the pursuit of their game,—only these, or in very rare instances those who have a natural aptitude for the sport, and are, in consequence, soon initiated into its requisite accomplishments, can hope even to come within long rifle range of a Chamois when the animal is at large upon its native cliffs. There are many familiar tales of the Alpine hunts, and of the terrible privations and hair-breadth escapes of the hunters, but as these histories relate rather to the man than to the beast, we can only give them a passing reference.

The Chamois is, when captured young, capable of domestication, and is gifted with very amusing habits, and possessed of infinite curiosity, as is generally the case with all animals whose nervous system is peculiarly sensitive. The following account is taken from the pages of the "Annals of Sporting," and alludes to four of these Antelopes, a buck, a doe, and two kids, which were imported into England:

"Originally, they were the property of Mr. Lowther, of Wolvesey, who, during his *séjour* among the Alps, was determined to try the experiment of domesticating some of these creatures, hitherto considered, by the natives, the most difficult to tame of all animals in that mountainous region. He may be said to have succeeded; for they were gradually familiarized to his chateau of Blonay, and to his domestics and people; to whom, from their novel nature and peculiarities, they afforded much interest and amusement.

"A *femme de chambre*, belonging to the establishment, they were most particularly attached to, and she to them; on a certain day, one of them strayed away for some time, and much regret arose in consequence, but the maid was indefatigable in searching for her truant favorite, and was, at length, fortunate in reclaiming the wanderer; who, on descrying her, trotted after her footseps, obeying the enticing cry of '*Lalotte, Lalotte,*' the name which had been given him.

"They are stated, by Mr. Lowther, to have been particularly inquisitive and curious in their habits, prying into everything that was brought into the chateau; the cook's basket, the tradesmen's wares, and the charcoal-man's bags. Of this last personage they were always indignant, and would pretend to make fight against him; but on his approach, would leap, with surprising agility and to a great height, upon any wall, ledge, or projectment, that offered itself, and would sustain them, returning invariably to the charge when the man of fuel turned his back, or retrograded; indeed, they would never suffer themselves to be touched; a finger not having yet reached them. They would admit of the hand being softly brought near their persons, but immediately as it arrived within an inch of their head or body, they would vault, suddenly and lightly, from the proffered contamination. To the gardener and coachman they were amazingly gracious, and would, apparently, take great delight in seeing the one sow his seeds and delve his soil, and the other clean his carriages and groom his horses; in fact, they became quite pets with all parties, and seemed to forget their wild haunts and mountain dwellings, in the warmer and less terrific asylums of civilized man."

As the hind legs exceed the fore limbs in length, the Chamois is better fitted for the ascent of steep ground than for descending, and never exhibits its wonderful powers with such success as when it is leaping lightly and rapidly up the face of an apparently inaccessible rock, and taking advantage of every little projection to add impetus to its progress. Even when standing still, it is able to mount to a higher spot without leaping. It stands erect on its hind legs, places its fore-feet on some narrow shelf of rock, and by a sudden exertion, draws its whole body upon the ledge, where it stands secure.

The food of the Chamois consists of the various herbs which grow upon the mountains, and in the winter season it finds its nourishment on the buds of sundry trees, mostly of an aromatic nature, such as the fir, pine, and juniper. In consequence of this diet, the flesh assumes a rather powerful odor, which is decidedly repulsive to the palates of some persons, while others seem to appreciate the peculiar flavor, and to value it as highly as the modern gourmand appreciates the "gamey" flavor of long-kept venison. The skin is largely employed in the manufacture of a certain leather, which is widely famous for its soft though tough character. The color of the Chamois is yellowish-brown upon the greater portion of the body, the spinal line being marked with a black streak. In the winter months, the fur darkens and becomes blackish-brown. The face, cheeks, and throat are of a yellowish-white hue, diversified by a dark brownish-black band which passes from the corner of the mouth to the eyes, when it suddenly dilates and forms a nearly perfect ring round the eyes. The horns are jetty black and highly polished, especially towards the tips, which are extremely sharp. There are several obscure rings on the basal portions, and their entire surface is marked with longitudinal lines.

Several varieties of the Chamois are recorded, but the distinctions between them lie only in the comparative length of the horns and the hue of the coat. The full-grown Chamois is rather more than two feet in height, and the horns are from six to eight inches long

THE PRONG-HORNED ANTELOPE, or CABRIT, bears some resemblance to the Chamois, from which animal it may be known by a peculiar structure of the horns, which throw out a projecting point, or prong, just at the spot where the horns begin their backward curve. It is a native of North America, where it is sometimes called the SPRING-BUCK, to the great confusion of zoological neophytes. It is an active and vigorous animal, and cannot be easily overtaken by a horse unless its footsteps are hindered by a fall of snow. It is a gregarious animal, migrating at different times of the year. It inhabits the vast prairies of the Far West, and is there, under the popular name of the Antelope, an object of pursuit by bipedal and quadrupedal hunters. Its scientific title is *Antilocapra americána.*

AMERICAN SPRING-BUCK.—*Antilocapra americana.*

Of all the Antelopes, the Gnoo presents the most extraordinary conformation. At the first sight of this curious animal, the spectator seems to doubt whether it is a horse, a bull, or an Antelope, as it appears to partake nearly equally of the nature of these three animals.

The Gnoos, of which there are several species, may be easily recognized by their fierce looking head, their peculiarly shaped horns, which are bent downwards and then upwards again with a sharp curve, by their broad nose, and long hair-clad tail. They live together in considerable herds, often mixing with zebras, ostriches, and giraffes, in one huge army of living beings. In their habits they are not unlike the wild cattle which have already been described. Suspicious, timid, curious of disposition, and irritable of temper, they display these mingled qualities in a very ludicrous manner whenever they are alarmed by a strange object.

"They commence whisking their long white tails," says Cumming, "in a most eccentric manner; then, springing suddenly into the air, they begin pawing and capering and pursue each other in circles at their utmost speed. Suddenly they all pull up together to overhaul the intruder when some of the bulls will often commence fighting in the most violent manner, dropping on their knees at every shock; then, quickly wheeling about, they kick up their heels, whirl their tails with a fantastic flourish, and scour across the plain, enveloped in a cloud of dust." On account of these extraordinary manœuvres, the Gnoo is called Wildebeest by the Dutch settlers.

The faculty of curiosity is largely developed in the Gnoo, which can never resist the temptation of inspecting any strange object, although at the risk of its life. When a Gnoo first catches sight of any unknown being, he sets off at full speed, as if desirous of getting to the farthest possible distance from the terrifying object. Soon, however, the feeling of curiosity vanquishes the passion of fear, and the animal halts to reconnoitre. He then gallops in a circle round the cause of his dread, halting occasionally, and ever drawing nearer. By taking advantage of this disposition, a hunter has been enabled to attract towards himself a herd of Gnoos which were feeding out of gunshot, merely by tying a red handkerchief to the muzzle of his gun. The inquisitive animals were so fascinated with the fluttering lure, that they actually approached so near as to charge at the handkerchief, and forced the hunter to consult his own safety by lowering his flag. The same ruse is frequently employed on the prairies of America, when the hunters desire to get a shot at a herd of prong-buck Antelopes.

Several experiments have been made in order to ascertain whether the Gnoo is capable of domestication. As far as the practicability of such a scheme was concerned, the experiments were perfectly successful, but there is a great drawback in the shape of a dangerous and infectious disease to which the Gnoo is very liable, and which would render it a very undesirable member of the cattle-yard. The animal is frequently infected with one of the Œestridæ, or Bot-flies, and suffers from them to such an extent that it ejects them from its nose whenever it snorts, an act which it is very fond of performing. Ordinary cattle have no love for the Gnoo, and on one occasion, when a young Gnoo of only four months old was placed in the yard, the cattle surrounded it and nearly killed it with their horns and hoofs.

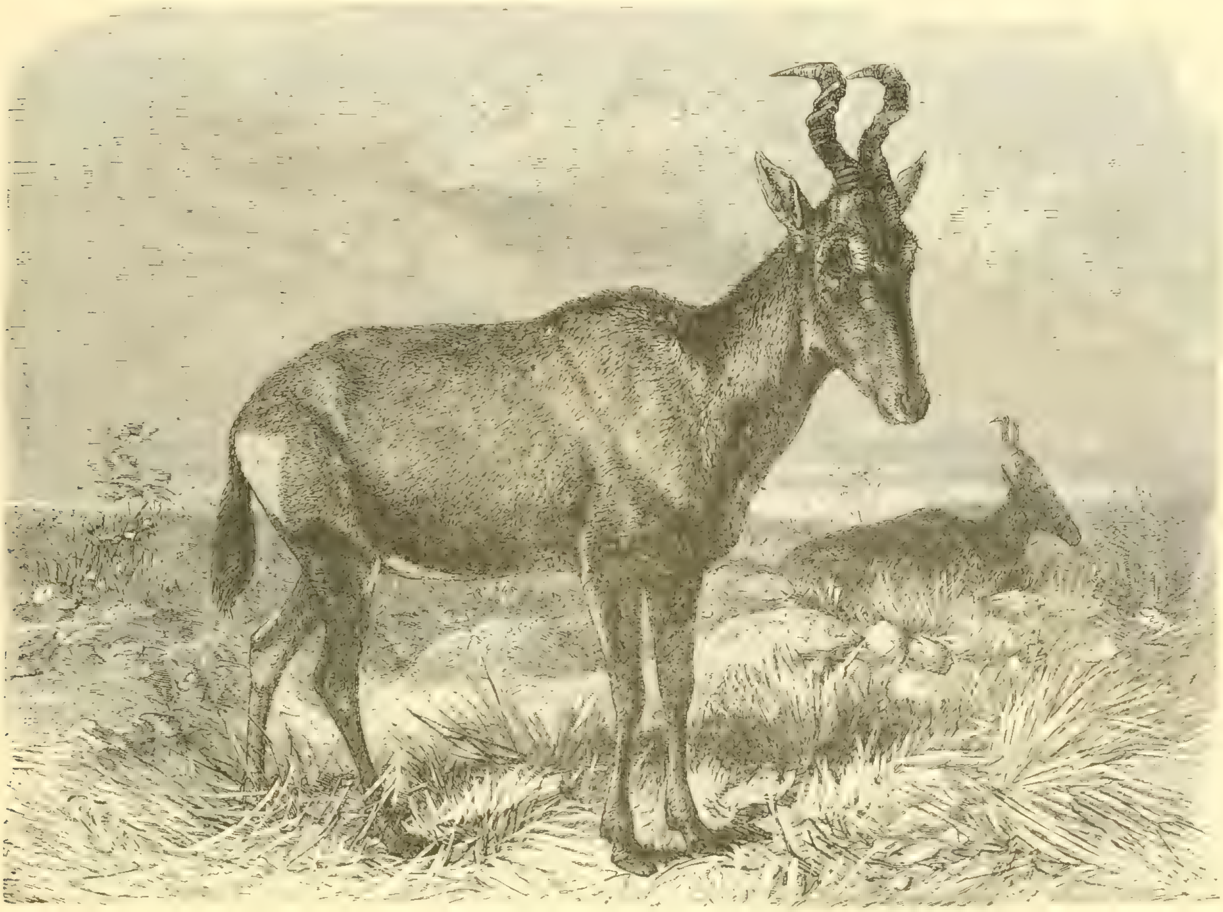
GNOO.—*Connochetes gnu.*

The color of the ordinary Gnoo (*Connochetes gnu*) is brownish-black, sometimes with a blue-gray wash. The mane is black, with the exception of the lower part, which is often grayish-white, as is the lower part of the tail. The nose is covered with a tuft of reversed hair, and there is a mane upon the chest. The Brindled Gnoo may be distinguished from the common Gnoo, or Kokoon, by its convex and smooth face, the hair lying towards the nose, instead of being reversed. There is no mane upon the chest, and the brown hide is varied and striped with gray. It is higher at the withers than the Kokoon, and its action is rather clumsy. It is very local in its distribution, being found northwards of the Black River, and never being known to cross that simple boundary. It lives in large herds, and when observed, the whole herd forms in single file, and so flies from the object of its terror.

One of these animals, called in the interior the Blue Wildebeest, was captured by Cumming in a very curious manner. The animal had contrived to hitch one of his fore-legs over his horns, and being thus incapacitated from running, was easily intercepted and killed. It had probably got into this unpleasant position while fighting. The Gnoo is about three feet nine inches high at the shoulders, and measures about six feet six inches from the nose to the root of the tail.

Of the genus Alcephalus, or Elk-headed, the HARTEBEEST, or LECAMA, is a good example.

This handsome animal may be easily known by the peculiar shape of the horns, which are lyrate at their commencement, thick and heavily knotted at the base, and then curve off suddenly nearly at a right angle. Its general color is a grayish-brown, diversified by a large, nearly triangular, white spot on the haunches, a black streak on the face, another along the back, and a black-brown patch on the outer side of the limbs. It is a large animal, being about five feet high at the shoulder. Being of gregarious habits, it is found in little herds of ten or twelve in number, each herd being headed by an old male who has expelled all adult members of his own sex.



HARTEBEEST.—*Bubalis caama.*

Not being very swift or agile, its movements are more clumsy than is generally the case with Antelopes. It is, however, very capable of running for considerable distances, and if brought to bay becomes a very redoubtable foe, dropping on its knees, and charging forward with lightning rapidity. The Hartebeest is spread over a very large range of country, being found in the whole of the flat and wooded district between the Cape and the tropic of Capricorn.

THE BUBALE, or BEKKER-EL-WASH, of Northern Africa (*Alcephalus bubalis*), belongs to the same genus as the Hartebeest. It may be mentioned here, that the word "beest" is employed by the colonists in the same sense that it is used by drovers; so that Wildebeest signifies "wild-ox," and Hartebeest "hart-ox."

THE PALLAH, or ROOVE-BOK, is also an inhabitant of Southern Africa, where it is seen in large herds, almost rivalling in number those of the spring-bok.

It is a remarkably fine animal, measuring three feet in height at the shoulder, and being gifted with elegantly shaped horns and a beautifully tinted coat.

The general color of the Pallah is bay, fading into white on the abdomen, the lower part of the tail, and peculiar disc of lighter-colored hairs which surrounds the root of the tail in so many Antelopes. There is a black semilunar mark on the croup, which serves as an easy method of distinguishing the Pallah from the other Antelopes. Its specific name, Melampus, is of Greek origin, signifying black-footed, in allusion to the jetty hue of the back of its feet.

The horns of this animal are of considerable length, often attaining to twenty inches, and are rather irregular in their growth. They are very distinctly marked with rings, and are lyrate in form, though not so decidedly as is the case with many other Antelopes.

The food of the Pallah is very similar to that of the spring-bok, and consists chiefly of tender herbage and the young twigs of the under-wood among which it generally takes up its abode.

It is hardly so timid an animal as the spring-bok, and will often allow strange creatures to approach the herd without much difficulty. It has a curious habit of walking away when alarmed, in the quietest and most silent manner imaginable, lifting up its feet high from the ground, lest it should haply strike its foot against a dry twig and give an alarm to its hidden foe. Pallahs have also a custom of walking in single file, each following the steps of its leader with a blind confidence; and when they have settled the direction in which they intend to march, they adhere to their plan, and will not be turned aside even by the presence of human beings. It is not so plain-loving an animal as the spring-bok, but is generally found in or near the district where low brushwood prevails.

THE wide and comprehensive group of animals which includes the Antelopes is so extremely large that it is impossible in a work of the present dimensions to give illustrations even of the more important species, and we must content ourselves with but brief notices in any case.

The SASIN, or INDIAN ANTELOPE (*Antilope bezoártica*), is generally found in herds of fifty or sixty together, each herd consisting of one buck and a large harem of does.

It is a wonderfully swift animal, and quite despises such impotent foes as dogs and men, fearing only the falcon, which is trained for the purpose of overtaking and attacking them, as has already been related of the gazelle. At each bound the Sasin will cover twenty-five or thirty feet of ground, and will rise even ten or eleven feet from the earth, so that it can well afford to despise the dogs. As its flesh is hard, dry, and tasteless, the animal is only hunted by the native chiefs for the sake of the sport, and is always chased with the assistance of the hawk or the chetah, the former of which creatures overtakes and delays it by continual attacks, and the other overcomes by stealthily creeping within a short distance, and knocking over his prey in a few rapid bounds. It is a most wary animal, not only setting sentinels to keep a vigilant watch, as is the case with so many animals, but actually detaching pickets in every direction to a distance of several hundred yards from the main body of the herd.

The young Sasins are very helpless at the time of their entrance into the world, and are not able to stand upon their feet for several days, during which time the mother remains in the covert where her little one was born. As soon as it has attained sufficient strength, she leads it to the herd, where it remains during its life, if it should happen to be a doe, but if it should belong to the male sex, it is driven away from its companions by the leading buck, whose jealousy will permit no rivals in his dominions. Forced thus to live by themselves, these exiles become vigilant and audacious, and endeavor to attract mates for themselves from the families of other bucks.

The horns of this animal are large in proportion to the size of their owner; their form is spiral, and they diverge considerably at their tips. From the base to the last few inches of the points, the horns are covered with strongly marked rings.

In color, the Indian Antelope is grayish-brown or black on the upper parts of the body, and white on the abdomen, the lips, breast, and a circle round the eyes. The outer sides of the limbs, together with the front of the feet and the end of the tail, are nearly black. Some of the oldest and most powerful males are so deeply colored that their coats are tinted with the two contrasting hues of black and white, the fawn tint being altogether wanting. The height of this animal is about two feet six inches at the shoulder.

THE GRYS-BOK is a native of Southern Africa, and is about the same size as the preceding animal, its height at the shoulder being between nineteen and twenty inches.

It is not very often found on the plains, but prefers to inhabit the wooded portions of the mountainous districts, and is an especially wary and vigilant creature, and endowed with great powers of speed.

The color of the Grys-bok is ruddy chestnut, largely intermixed with white hairs, which give it a stippled appearance, and have caused the Dutch Boers to term it the Grys-bok, or Gray-buck. The under portions of the body are not white, as is so often the case among the Antelopes, but are of a reddish-fawn. The ears are more than four inches in length, and from their conspicuously black tips have earned for the Grys-bok the scientific title of Melanotis, or black-eared. The hoofs are peculiarly small, sharp, and black, and the tail is so short that it barely protrudes beyond the hair of the hinder quarters.

THE OUREBI is another of the many Antelopes which inhabit Southern Africa.

Whilst many animals of the Antelope kind fly from the presence of man, and do not approach within a distance of many hundred miles of his residence, there are some few which do not appear to have this great dread of him, but which adhere to particular localities as long as their position is tenable, or until they fall victims to their temerity. It also appears as if some spots were so inviting, that immediately they become vacant by the death of one occupant, another individual of the same species will come from some unknown locality, and re-occupy the ground. Thus it is with the Ourebi, which will stop in the immediate vicinity of villages, and on hills and in valleys, where it is daily making hair-breadth escapes from its persevering enemy, man.

When day after day a sportsman has scoured the country, and apparently slain every Ourebi within a radius of ten miles, he has but to wait for a few days, and upon again taking the field he will find fresh specimens of this graceful little Antelope bounding over the hills around him.

It is generally found in pairs, inhabiting the plains, and when pursued, trusts to its speed, seeking no shelter either in the bush or the forest. Its general habitation is among the long grass which remains after a plain has been burned, or on the sheltered side of a hill, among rocks and stones.

Its mode of progression, when alarmed or disturbed, is very beautiful. It gallops away with great rapidity for a few yards, and then bounds several feet in the air, gallops on, and bounds again. These leaps are made for the purpose of examining the surrounding country, which it is enabled to do from its elevated position in the air. Sometimes, and especially when any suspicious object is only indistinctly observed in the first bound, the Ourebi will make several successive leaps, and it then looks almost like a creature possessed of wings, and having the power of sustaining itself in the air. If, for instance, a dog pursues one of these Antelopes, and follows it through long grass, the Ourebi will make repeated leaps, and by observing the direction in which its pursuer is advancing, will suddenly change its own course, and thus escape from view. In descending from these leaps the Ourebi comes to the ground on its hind feet. In his description of this animal, Captain Drayson gives the following account of some of its habits:—

"When first started, the Ourebi pursues over the ground a course somewhat similar to that which a snipe follows in the air. It dodges from side to side, leaps and rushes through the grass or over the plain with a lightning-like speed, and almost before the sportsman can get his gun ready, the Ourebi is scudding away at a distance of a hundred yards or so. Some sportsmen shoot this animal with buckshot, and by walking through the long grass, and coming suddenly upon the creature in its lair, they pepper it with shot before it has time to get out of range. I tried this system for several days, but at length found that better and neater sport might be had by using a bullet instead of shot. As, moreover, the grass was in many places five feet in height, it would have prevented me from seeing the animals as they rushed off, whereas, from the back of my horse, I could look down upon the Ourebis as they moved out of their lairs. These animals are found in some parts of the colony of the Cape, and are very numerous in the plains about Natal.

"They produce one fawn at a time, which can be easily caught with a good dog, and is particularly recommended as a table delicacy, when cooked with a proper mixture of fat.

"The Ourebi does not carry off so heavy a charge of shot as the duyker or the reit-bok, and if wounded by a bullet, the sportsman is certain to secure his prize, provided that he watches the animal with care. When badly hit, they will frequently retire into long grass, and crouching low, will hide themselves from the casual observer. They will then creep away for several yards, and lie down behind a stone, ant-hill, or some similar cover. When the hunter passes and overlooks them, they will jump up and retreat as soon as his back is turned. Taking advantage of this practice, I always avoid looking directly at an Ourebi if I see it lying on the plain, and after taking 'bearings' of its position, I ride round the prostrate animal in circles, gradually drawing nearer and nearer, until it can be easily shot."

The Ourebi stands about two feet in height at the shoulder, and is about four feet in length. The horns of the full-grown male are about five inches long, straight, and pointed, and covered with bold rings at the base.

The color of the Ourebi is pale tawny above, and white below. The female is hornless.

One of the prettiest and most graceful of the Antelopes is the Klippspringer, or Kainsi (*Oreótragus saltátrix*).

This "darling little Antelope," as Gordon Cumming terms it, almost equals the chamois in its agile traversing of the precipitous localities in which it takes up its residence.

It is peculiarly formed for rocky ground, its hoofs being small, hard, sharply-pointed, and so formed that when the animal stands, its weight rests only on the tips of the feet.

It may often be seen perched on some narrow point of vantage, standing like the chamois, with all its feet drawn closely together, and calmly surveying the prospect from a height which would prove instantly fatal were one of its feet to miss its hold. When startled, it dashes at once at the most precipitous rocks that are within reach, and bounds up their apparently inacessible faces as if it were an India-rubber ball endowed with sudden vitality. The least projection serves it for a foothold, and its movements are so rapid, that a very few seconds serve to place it in safety from any other foe than a rifle-ball.

The Bechuanas have a curious idea that the cry of the Klippspringer is a kind of invocation to the pluvial powers of the air, and are therefore in the habit of catching a number of these poor little creatures whenever they suffer from drought, and of making them cry continually by blows and pinches until rain falls. They rightly boast that it is a most infallible method of making rain, which is truly the case, as they never cease until the desired moisture is seen. In a similar manner the American Indians vaunt the potency of their sacred bison-dance for attracting the "buffalo," for if the bison herds do not make their appearance at the proper time, they commence the efficacious saltation, and never leave off until their scouts bring news of the desired herds.

The color of the Klippspringer is dark brown, sprinkled largely with yellow, which gives to the coat a grizzled aspect. Each hair is yellow at the extremity, brown towards the end, and gray for the remaining part of its length. The tint of this animal is rather variable, according to the season of the year and the age and sex of the individual.

It is a very little creature, being scarcely twenty-one inches in height when full-grown. In general form it is not unlike the ibex kid of six or seven months old. The female is hornless.

The graceful and slender-limbed Madoqua (*Neótragus saltiána*) is one of the tiniest of

Antelopes, being hardly fourteen inches in height at the shoulder, and of most delicate proportions.

The little creature is so slightly made that it appears to be too fragile to resist the slightest breeze, or to brave the inclemency of the open air. Its legs are very long in proportion to the dimensions of the body, and hardly exceed a lady's finger in thickness.

The color of the Madoqua is remarkably beautiful, being a silvery-gray on the upper parts of the body and outside of the limbs, deepening into warm chestnut-brown along the back, and becoming pure white on the abdomen, chest, inner surface of the limbs, and around the root of the tail. It is a native of Abyssinia, where it was discovered by Bruce, and is said to inhabit mountainous districts, where it lives in pairs.

THE RHOODE-BOK, OR NATAL BUSH BUCK (*Cephálopus natalensis*) is very common in the Natal forests, and although the advance of civilization and the spread of fire-arms among the Kaffirs must greatly reduce the numbers of these animals, still, from their watchful habits and selection of the most retired parts of large dense forests as their residence, they will remain much longer in their old quarters than those animals which inhabit plains and are destitute of any secure retreat. This buck is solitary, and rarely leaves the dense forests except in the evening or during rainy weather, when it seems to prefer feeling the rain drops *au naturel* to receiving them second-hand from the bushes.

It is very amusing to watch the habits of this wary buck when it scents danger in the bush. Its movements become most cautious; lifting its legs with high, but very slow action, it appears to be walking on tip-toe among the briers and underwood, its ears moving in all directions, and its nose pointing upward or towards the suspected locality. If it hears a sudden snapping of a branch or any other suspicious sound, it stands still like a statue, the foot which is elevated remains so, and the animal scarce shows a sign of life for near a minute. It then moves slowly onwards with the same cautious step, hoping thus to escape detection. If, however, it obtains a sight of danger, or clearly scents some foe, it gives a sharp sneeze, and bounds away through the forest, alarming all other animals in its progress.

The Kaffirs lay snares for this animal by making a noose which is held to the ground by a small peg, while the other end of the cord is fastened to the bent-down limb of a living tree. As soon as the head of the buck passes into the noose the peg is released, and the victim is jerked into the air by the recoil of the liberated branch, and so strangled.

The Red Buck is about two feet high, its horns are about three inches long, straight and pointed, and its ears are rather large.

The color is a deep reddish-brown, which is difficult to distinguish in a dull day, but can be more easily seen on a bright sunny morning, especially if a gleam of light shines through the thick branches and alights on the ruddy coat of the animal.

THE BLUE-BUCK (*Cephálopus pygmæa*) is scarcely more than a foot in height, and about two feet long.

It possesses small straight horns about two inches in length, closely annulated; its color is a dark blue or mouse tint.

The most practised eyes are required to discover this buck in the bush, as its color is so similar to the gloom of the under-wood that if it did not shake the branches in its progress, it would be scarcely possible to see it.

Long after the sportsman has become sufficiently acquainted with bush-craft to secure with certainty one or two red bucks during a day's stalking, he would still be unable to bag the little Blue Buck.

Several times when I was with a Kaffir, who possessed eyes like those of an eagle, he would point, and with great excitement say, "There goes a Blue-buck! there he is! there, there!" but it was of no use to me. I would strain my eyes and look to the spots pointed out, but could see no buck; and it was a considerable time before my sight became sufficiently quick to enable me to drop this little Antelope with any certainty.

The animal must not be mistaken for the blau-bok (*Ægocerus leucophæus*), which will be mentioned on a succeeding page. Although the two Antelopes are entirely distinct, even in external aspect, they have often been confused together in consequence of the Dutch name, Blau-bokje, having been given to both of them on account of the color of their coat.

PASSING by several interesting animals, for whose biography there is no space, we arrive at another of the South African Antelopes, the RIET-BOK, or REED-BUCK.

This fine and handsome Antelope is found, as his name implies, principally among reeds or long grass.

Few animals give the sportsman such a chance as the Riet-bok, for he usually lies concealed in the reeds or long grass until he is nearly trodden on, and when he does break away, he moves at a steady gallop for a short distance, and then stops to turn and look at his pursuers. As though to compensate for this incautious proceeding, the Riet-bok is gifted with a marvellous tenacity of life, and will frequently gallop very freely after a bullet has passed through his body. In very many cases his escape is but temporary, as he seeks some retired kloof in which he dies by inches, or his career is terminated during the night by a pack of hungry hyenas, who have tracked him for miles over his blood-stained spoor. But still he does sometimes retreat and recover after receiving very severe hurts.

When the Riet-bok is disturbed, he gives as he gallops off a kind of whistling sneeze, which is usually intended as a call for the doe. This whistle sometimes leads to his destruction, as the hunter may pass close to a hidden buck and not have seen it. Then, however, he usually jumps up and gallops away, giving this whistle, which at once attracts attention.

The Riet-bok is very fond of young corn, and therefore the Kaffirs are most anxious to drive away or to kill any of these Antelopes which had chosen a retreat near their corn-fields. Hunters have often won the eternal friendship of a whole village by shooting some trespassing bucks which had annoyed them.

The height of this animal is about three feet, and its length nearly five feet. The horns are a foot in length, and covered with bold rings at the base; the ears are six inches long.

Its color is ashy-gray above, and white beneath; the female is rather smaller than her mate, and is destitute of horns. In the Kaffir language its name is Umseke.

THE ÆQUITOON, KOB, or SING-SING, is a native of Western Africa, and is frequently found on the banks of the Gambia.

It is a large animal, equalling the common stag in dimensions, and bearing some resemblance to that animal in general aspect. The horns of the adult male are lyre-shaped, and covered with rings.

The general color of this animal is a pale brown, the entire under surface and inner faces of the limbs being white. There is no mane, and the tail is rather long, and covered with hair.

THE WATER BUCK, or PHOTOMOK, is one of the handsomest examples of the South African Antelopes.

It is a peculiarly timid animal, and when alarmed rushes at once towards the nearest river, into which it plunges without hesitation, and which it will cross successfully even when the stream is deep, strong, and rapid. The animals are probably induced to take to the water by their instinctive dread of the lion and leopard, which will never voluntarily enter the water, except under peculiar circumstances. The Water Bucks are generally found in small herds, which never wander far from the banks of some large river.

The horns of this species are remarkable for their formation, being somewhat lyrate, bent back, and thrown forwards at their extremities. The tail is rather long, and is covered with long hairs towards its termination.

The flesh of this animal is very powerfully scented, and is of so bad a flavor that none but a hungry Kaffir will eat it, and even he will not do so until forced by dire hunger. This peculiar scent is probably variable in potency according to the season of the year, as is the case with all perfumed animals. Hunters say that those which they killed have been totally uneatable, not even the native palate being proof against the rank flavor. The scent extends to the skin, which exhales so powerful an odor that, when hunters were engaged in cutting off the head of a Water Buck which they had killed, the scent was so strong as to drive them repeatedly from their task. The color is brown, with the exception of a grayish-white oval patch round the base of the tail.

The specific term, *ellipsyprymnus*, is given to the animal in reference to this elliptical mark. The female is without horns. The height of the adult male is about four feet six inches, and his horns are rather more than thirty inches in length.

THE two species which are placed in the genus Ægocerus bear a considerable resemblance to the ibex in the formation of the horns, which are of very great dimensions, large at the base, strongly ringed, and curved backwards towards the shoulders. The name Ægocerus is of Greek origin, and signifies Goat-haired, in allusion to the peculiar structure of these appendages.

The BLAU-BOK, or BLUE BUCK, as it is called, on account of the slaty-blue color of its coat, is now a rather rare animal, although it was formerly common in many parts of Southern Africa.

It is a gregarious animal, living in little herds not exceeding ten or twelve in number, and preferring hills and slopes to level ground. Like the preceding animal, it exhales a powerful odor, which penetrates throughout its entire body, and which renders its flesh so unpalatable that it is never eaten as long as other food can be obtained. It is a swift and active creature, being remarkable for its speed even among the swift-footed Antelopes. There is a variety of this animal, called the DOCOI, which is found by the Gambia, and which is not quite of the same color. The natives assert that the female never produces more than a single young one during her lifetime, for that the mother's horns grow so rapidly after the birth of the offspring, that they penetrate into her back and kill her. The Blau-bok is about four feet in height, and the horns are nearly thirty inches in length.

ALTHOUGH the blau-bok is a truly handsome example of the Antelopes, it is surpassed in beauty by its congener, the SABLE ANTELOPE.

This truly magnificent creature is found in Southern Africa, but is never seen near the colony, as it is a very shy and crafty animal, and being possessed of great speed, is sure to keep itself far aloof from civilization. Gordon Cumming's description of this animal is as follows:

"Cantering along through the forest, I came suddenly in full view of one of the loveliest animals which graces this fair creation. This was an old buck of the Sable Antelope, the rarest and most beautiful animal in Africa. It is large and powerful, partaking considerably of the nature of the ibex. Its back and sides are of glossy black, beautifully contrasting with the belly, which is white as driven snow. The horns are upwards of three feet in length, and bend strongly back with a bold sweep, reaching nearly to the haunches."

It lives in herds of no very great size, consisting mostly of ten or twelve does led by a single buck. As a general fact, the buck takes matters very easily, and trusts to the does for keeping a good watch and warning him of the approach of an enemy. Owing to the jealous caution of these female sentinels, the hunter finds himself sadly embarrassed when he wishes to enrich his museum with the horns of their leader, and if any of them should happen to take alarm, the whole herd will bound over the roughest ground with such matchless speed that all pursuit is hopeless. In Captain Cumming's well-known work, there is a most animated description of the proceedings of a herd of Sable Antelopes, and of the hunter's manœuvres in order to gain his point.

In the native dialect, the Sable Antelope is known under the name of Potaquaine. It is very tenacious of life, and will often make good its escape even though pierced entirely through the body with several bullets. It therefore fully tests all the powers of the hunter, and he who secures a specimen of an old male Sable Antelope may congratulate himself on possessing one of the noblest trophies of which a sportsman can boast.

THE SASSABY, or BASTARD HARTEBEEST, as it is sometimes called, is by no means an uncommon animal, although some few years ago it was only known through the means of a mutilated skin.

The general color of this animal is reddish-brown, the outer sides of the limbs being dark, and a blackish-brown stripe passing down the middle of the face. Sometimes the body is washed with a bluish-gray. It lives in small herds of six or ten, in the flat districts near the tropic of Capricorn, and is a most welcome sight to the wearied hunter when perishing with thirst. There are many Antelopes which are almost independent of water, and can quench their thirst by means of the moist roots and bulbs on which they feed. But the Sassaby is a thirsty animal, and needs to drink daily, so that whenever the hunter sees one of these animals he knows that water is at no great distance. It is rather persecuted by the hunters, as its flesh is in great esteem; but as it soon becomes shy and wary, is not easily to be killed.

Concerning one of these animals, Cumming gives the following curious anecdote:—"Having shot a Sassaby as I watched the water, he immediately commenced choking from the blood, and his body became swelled in a most extraordinary manner: it continued swelling with the animal still alive, until it literally resembled a fisherman's float, when the animal died of suffocation. It was not only his body that swelled in that extraordinary manner, but even his head, and legs down to his knees." The poor animal must have been shot through the lungs in such a manner that the air was forced by its efforts at respiration between the skin and flesh, until it assumed that puffy aspect.

THE regularly lyrate horns of the BONTE-BOK, or NUNNI, serve to distinguish it from its congener, the sassaby.

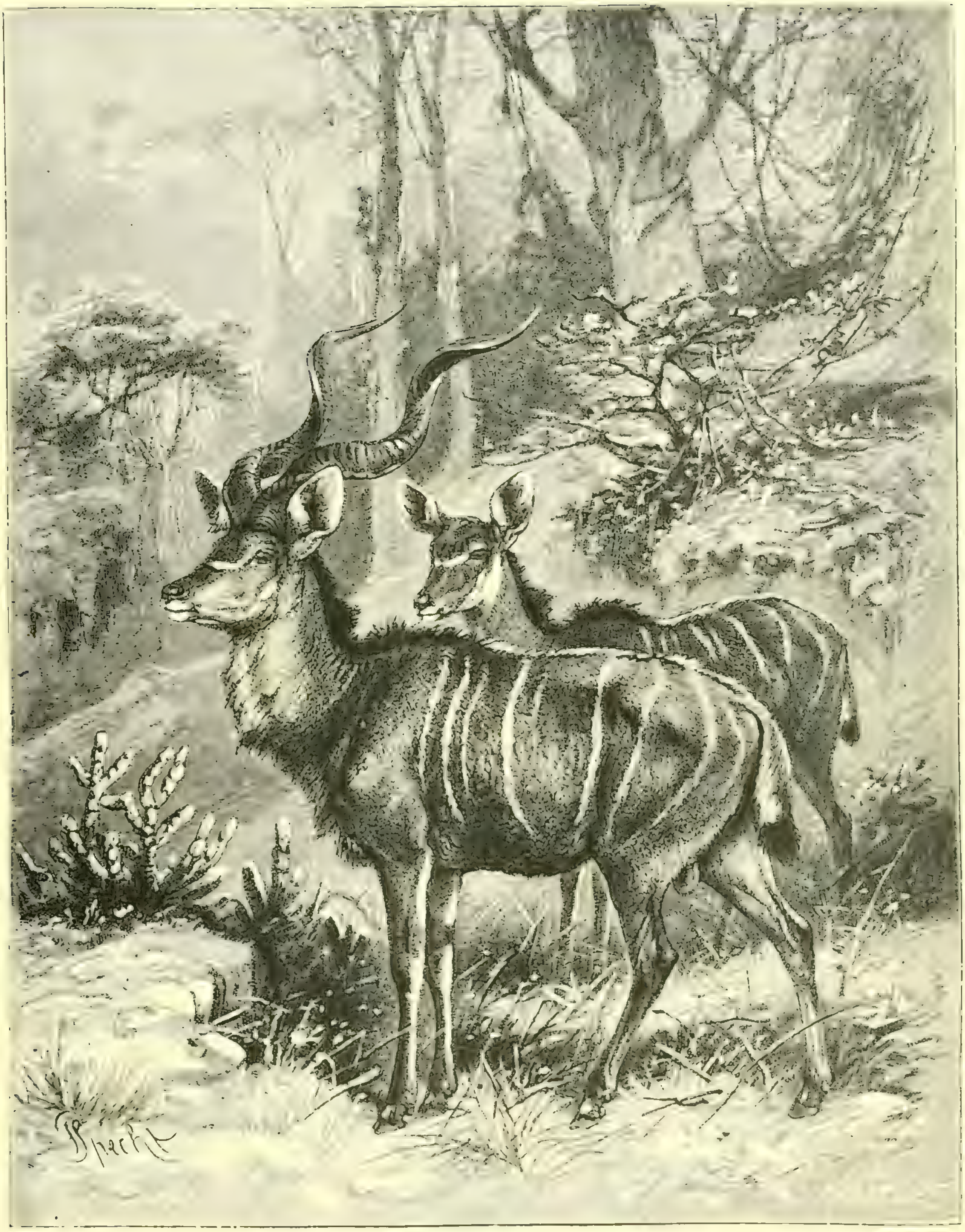
The color of the Bonte-bok is a purplish-red, the outside of the limbs deepening into a rich, blackish-brown, and contrasting strongly with the white hair which appears upon the face, the haunches, and front of the legs. From the vividly contrasting tints of the coat, it has derived the name of Pied Antelope, or White-faced Antelope. The female is not so highly colored as the male, and the throat and under parts of the body are white. This animal is found in the district that borders the colony at the Cape of Good Hope, and lives in little herds of six or eight in number. Herds of much larger dimensions are said to be found in the more northern district. The height of the Bonte-bok is nearly four feet at the shoulder, and its length is about six feet, being thus superior to the common stag in size. The horns are black in color, and are furnished with a series of ten or twelve half-rings in their frontal surfaces. Their length is about fourteen or fifteen inches.

THE BLESS-BOK (*Damalis álbifrons*) has sometimes been confounded with the bonte-bok; there is, however, a marked distinction in the color of the coat. The name, Bless-bok, or Blaze-buck, is given to this animal on account of the "blaze" of white upon the face, and is equally applicable to the bonte-bok.

BY far the most striking and imposing of all South African Antelopes, the KOODOO, now claims our attention.

This truly magnificent creature is about four feet in height at the shoulder, and its body is rather heavily made, so that it is really a large animal. The curiously twisted horns are nearly three feet in length, and are furnished with a strong ridge or keel, which extends throughout their entire length. It is not so swift or enduring as the bless-bok, and can be run down without difficulty, provided that the hunter be mounted on a good horse, and the ground be tolerably fair and open. Its leaping powers are very great, for one of these animals has been known to leap to a height of nearly ten feet without the advantage of a run.

The Bushmen have a curious way of hunting the Koodoo, which is generally successful in the end, although the chase of a single animal will sometimes occupy an entire day. A large number of men start on the "spoor," or track, one taking the lead and the others following leisurely. As the leading man becomes fatigued he drops into the rear, yielding his place to another, who takes up the running until he too is tired. A number of women bearing ostrich



KOODOO.

Animate Creation.

We have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the Animal World, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an Illustrated Natural History, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to those who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work —a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. Holder, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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egg-shells filled with water accompany the hunters, so that they are not forced to give up the chase through thirst. As the chase continues, the Koodoo begins to be worn out with continual running, and lies down to rest, thereby affording a great advantage to its pursuers, who soon come within sight, and force it to rise and continue the hopeless race. At last it sinks wearied to the earth, and falls an unresisting prey to its foes.

THE ELAND, IMPOOFO, or CANNA, is the largest of the South African Antelopes, being equal in dimensions to a very large ox.

A fine specimen of an adult bull Eland will measure nearly six feet in height at the shoulders, and is more than proportionately ponderous in his build, being heavily burdened with fat as well as with flesh. Owing to this great weight of body, the Eland is not so enduring as the generality of the Antelopes, and can usually be ridden down without much trouble. Indeed, the chase of this animal is so simple a matter, that the hunters generally contrive to drive it towards their encampment, and will not kill it until it has approached the wagon so closely that the hunters will have but little trouble in conveying its flesh and hide to their wheeled treasure-house.

The flesh of the Eland is peculiarly excellent; and as it possesses the valuable quality of being tender immediately after the animal is killed, it is highly appreciated in the interior of South Africa, where usually all the meat is as tough as shoe-leather, and nearly as dry. In some strange manner, the Eland contrives to live for months together without drinking, and even when the herbage is so dry that it crumbles into powder in the hand, the Eland preserves its good condition, and is, moreover, found to contain water in its stomach, if opened. For its abstinence in liquids, the Eland compensates by its ravenous appetite for solid food, and is so large a feeder that the expense of keeping the animal would be almost too great for any one who endeavored to domesticate the animal with any hope of profit.

The color of the Eland is a pale grayish-brown, and the horns are nearly straight, spirally twisted, and of considerable size.

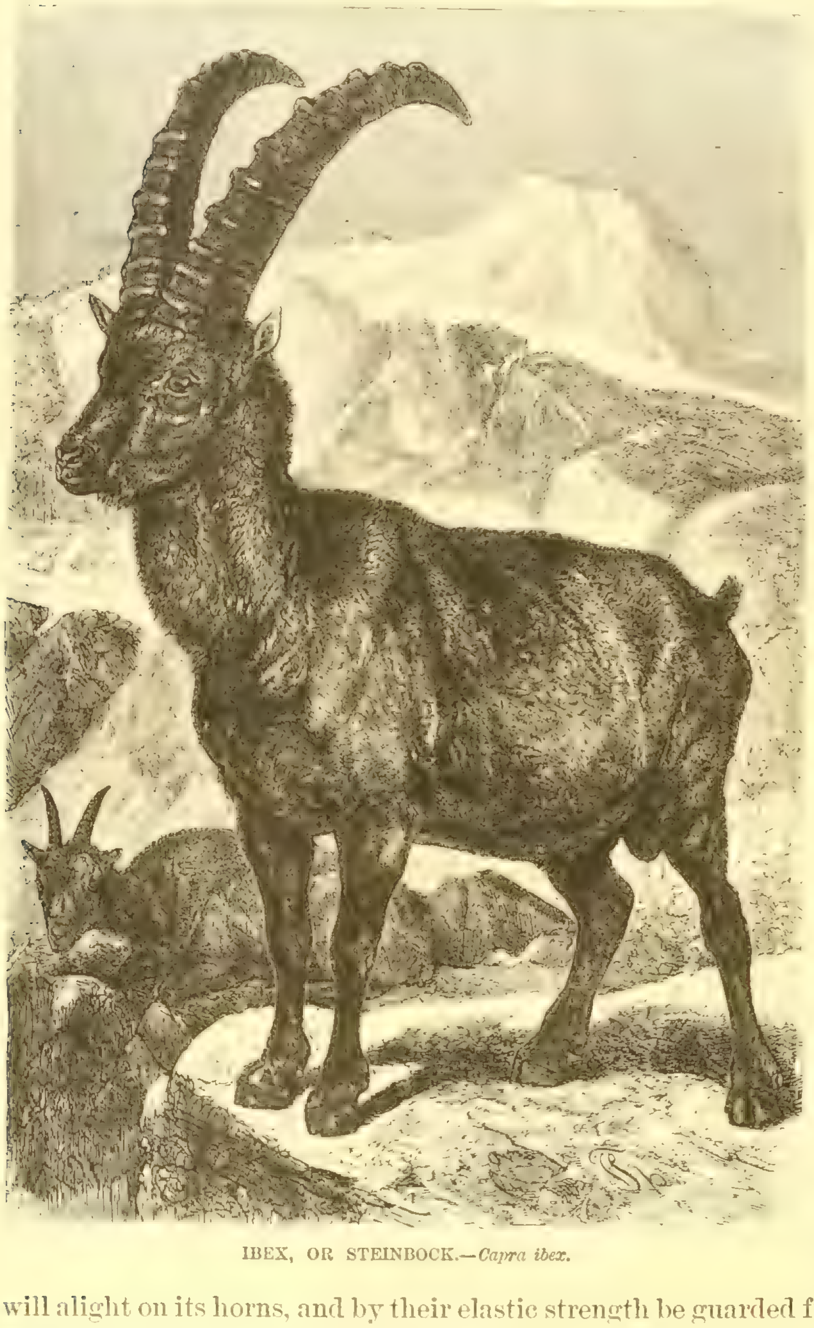
A variety of this animal, termed the Striped Eland, is sometimes, but rarely, seen. Some few years ago, when Colonel Faddy was in Southern Africa, he shot several of these animals, and brought their skins home as trophies of success. Neither at the Cape nor in England was he believed when he described the animals which he had been fortunate enough to kill, and it was not until he produced the skins that his account was credited. The skins were presented to the institution attached to the Royal Artillery barracks at Woolwich, and may be seen in the museum.

GOATS AND SHEEP.

CLOSELY allied to each other, the GOATS and the SHEEP can be easily separated by a short examination. In the Goats, which will first come under consideration, the horns are erect, decidedly compressed, curved backwards and outwards, and are supplied with a ridge or heel of horny substance in front. The males generally possess a thickly bearded chin, and are all notable for a powerful and very rank odor, which is not present in the male sheep.

The JHARAL or JEMLAH GOAT (*Hemitragus jemlaicus*) is a remarkably handsome animal, inhabiting the loftiest mountains of India, and traversing with ease the precipitous crags which are inaccessible to almost any wingless beings except themselves. Their strongholds, where they pass the night, and to which they fly when alarmed, are situated above the line of vegetation, and border upon the limits of perpetual snow. By day they descend to feed in little flocks of twenty or thirty in number, each flock being under the guidance of an old male, whose mandates they implicitly obey. They are shy and cautious animals, and the slightest unaccustomed sound is sufficient to send them towards their rocky fastnesses, ever and anon halting and looking back to examine the cause of their terror.

The hair of this animal is extremely long and coarse, hanging mane-like on each side of its head and neck. The general color of the Jharal is a very pale grayish-fawn, diversified with a dark streak along the back, and a brown mark on the forehead and front of the legs. The horns are very curiously formed. They are very much depressed, and are very wide at the base, from whence they spread outwards, and then suddenly narrow into a point, which is curled so strongly inwards that the two points nearly meet above the neck. Upon their frontal edge are seven small distinct protuberances, becoming gradually obliterated as they are set higher upon the horns, and each creating a wrinkle which passes nearly round the entire horn. Their color is grayish-buff.



IBEX, OR STEINBOCK.—*Capra ibex.*

Of the genus Capra, which includes several species, the Ibex, or Steinbock, is a familiar and excellent example.

This animal, an inhabitant of the Alps, is remarkable for the exceeding development of the horns, which are sometimes more than three feet in length, and of such extraordinary dimensions that they appear to a casual observer to be peculiarly unsuitable for an animal which traverses the craggy regions of Alpine precipices. Some writers say that these enormous horns are employed by their owner as "buffers," by which the force of a fall may be broken, and that the animal, when leaping from a great height, will alight on its horns, and by their elastic strength be guarded from the severity of a shock that would instantly kill any animal not so defended. This statement is, however, but little credited.

To hunt the Ibex successfully is as hard a matter as hunting the chamois, for the Ibex is to the full as wary and active an animal, and is sometimes apt to turn the tables on its pursuer, and assume an offensive deportment. Should the hunter approach too near the Ibex, the animal will, as if suddenly urged by the reckless courage of despair, dash boldly forward at its foe, and strike him from the precipitous rock over which he is forced to pass. The difficulty of the chase is further increased by the fact, that the Ibex is a remarkably enduring animal, and is capable of abstaining from food or water for a considerable time.

It lives in little bands of five or ten in number, each troop being under the command of an old male, and preserving admirable order among themselves. Their sentinel is ever on the watch, and at the slightest suspicious sound, scent, or object, the warning whistle is blown, and the whole troop make instantly for the highest attainable point. Their instinct always leads them upwards, an inborn "excelsior" being woven into their very natures, and as soon as they perceive danger, they invariably begin to mount towards the line of perpetual snow. The young of this animal are produced in April, and in a few hours after their birth they are strong enough to follow their parent.

The color of the Ibex is a reddish-brown in summer, and gray-brown in winter; a dark stripe passes along the spine and over the face, and the abdomen and interior faces of the limbs are washed with whitish gray. The horns are covered from base to point with strongly marked transverse ridges, the number of which is variable, and is thought by some persons to denote the age of the animal. In the female the horns are not nearly so large nor so heavily ridged as in the male. The Ibex is also known under the name of BOUQUETIN.

THE members of the genus Hircus may be distinguished from the ibex and the sheep by the peculiar formation of their horns, which are compressed, are rounded behind, and furnished with a well-developed keel in front. In some instances the keel is ragged, or appears like a series of knobs, but in all cases it is prominently conspicuous.

There are an enormous number of varieties of the common domestic GOAT, many of them being so unlike the original stock from which they sprang as to appear like a different species. For the present, we will turn to the common Goat, with which we are all so familiar. This animal is often seen domesticated, especially in and about stables, as there is a prevalent idea that the rank smell of the Goat is beneficial to horses. Be this as it may, the animal seems quite at home in a stable, and a very firm friendship often arises between the Goat and one of the horses. Sometimes it gets so petted by the frequenters of the stables, that it becomes presumptuous, and assaults any one whom it may not happen to recognize as a friend. Happily, a Goat, however belligerent he may be, is easily conquered if his beard can only be grasped, and when he is thus captured, he yields at once to his conqueror, assumes a downcast air, and bleats in a very pitiful tone, as if asking for mercy.

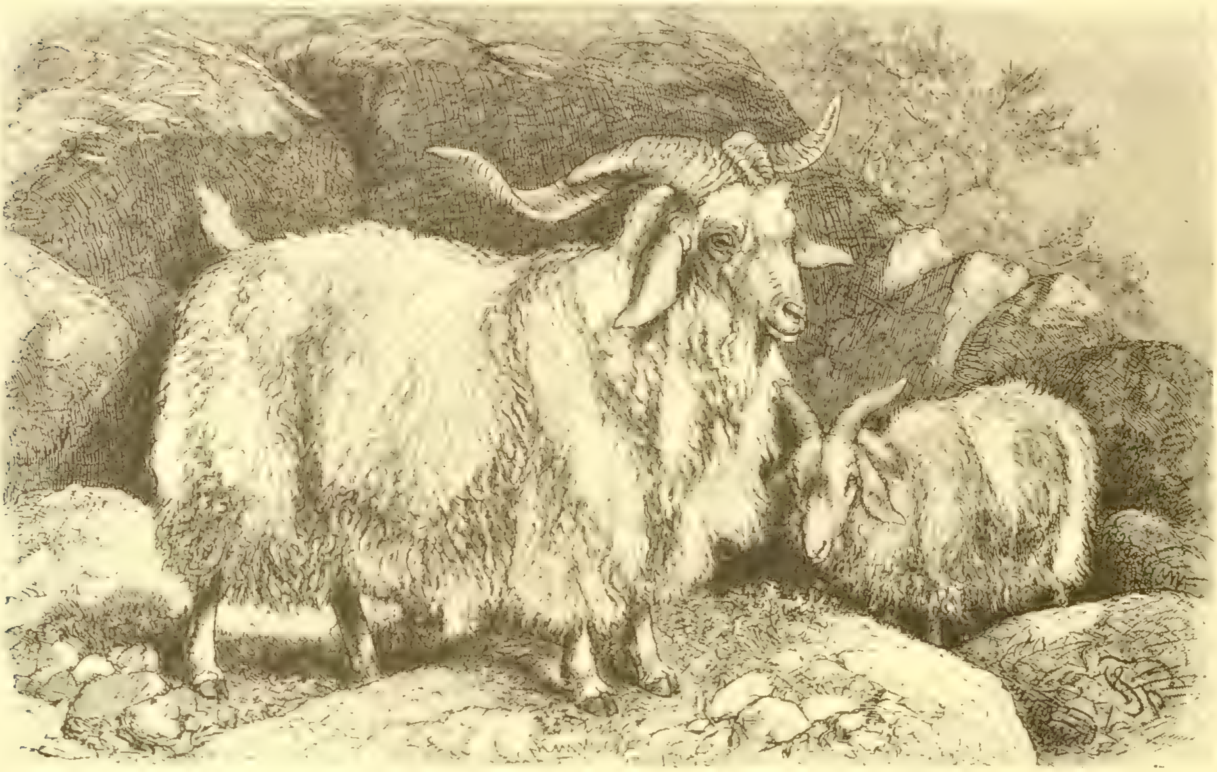
At the Cape of Good Hope, large flocks of these animals are kept, and are extremely sagacious, needing no goat-herd to watch them, and are altogether more wise than sheep. In the morning they sally out upon their foraging expeditions, and in the evening they voluntarily return. It is said that Goats are the only animals that will boldly face fire, and that their chief use in a stable is to lead the horses from the stalls in case of the stables being burned. Horses are such nervous, excitable animals, that when their dwelling has taken fire they cannot be induced to face the dreaded element, and must see some other animal lead the way before they will dare to stir. It is also said, and apparently with reason, that in case of fire, a horse may be easily removed from the scene of danger by harnessing him as usual, instead of trying to lead him out at once. The animal has learned to connect obedience and trustfulness with the harness, and while he bears the bit in his mouth, and the saddle or traces on his back, he will go wherever he may be led. Blindfolding the horse is another good method of inducing the animal to follow its guide without hesitation.

The Goat is, like several other domesticated animals, able to foretell stormy weather, and always contrives to place itself under shelter before the advent of a storm. The flesh of the Goat is not held in great estimation, and even that of the kid, which is comparatively tender and well-flavored, has fallen into disrepute. The milk is, however, in some demand, being of a rather peculiar flavor, which is grateful to certain palates.

In its wild state, the Goat is a fleet and agile animal, delighting in rocks and precipitous localities, and treading their giddy heights with a foot as sure and an eye as steady as that of the chamois or ibex. Even in domesticated life this love of clambering is never eradicated, and wherever may be an accessible roof, or rock, or even a hill, there the Goat may be generally found.

The varieties of the Goat are almost numberless, and it will be impossible to engrave, or even to notice, more than one or two of the most prominent examples. One of the most valuable of these varieties is the celebrated Cashmir Goat, whose soft silky hair furnishes material for the soft and costly fabrics which are so highly valued in all civilized lands.

This animal is a native of Thibet and the neighboring locality, but the Cashmir shawls are not manufactured in the same land which supplies the material. The fur of the Cashmir Goat is of two sorts: a soft, woolly under coat of grayish hair, and a covering of long silken hairs that seem to defend the interior coat from the effects of winter. The woolly under coat is the substance from which the Cashmir shawls are woven, and in order to make a single shawl, a yard-and-a-half square, at least ten Goats are robbed of their natural covering. Beautiful as are these fabrics, they would be sold at a very much lower price, but for the heavy and numerous taxes which are laid upon the material in all the stages of its manufacture, and after its completion upon the finished article. Indeed, the buyer of a Cashmir shawl is forced to pay at least a thousand per cent. on his purchase.



ANGORA GOAT.—*Capra hircus var. angorensis.*

Attempts have been made to domesticate this valuable animal in Europe, but without real success. It will unite with the Angora Goat and produce a mixed breed, from which may be procured very soft and fine wool, that is even longer and more plentiful than that of the pure Cashmir Goat. As a commercial speculation, however, the plan does not seem to have met with much success.

There are at least forty acknowledged varieties of the Goat, among which may be mentioned the Berbura, or Ram Sagul, of India, a Goat which is remarkable for being destitute of beard and for the large dewlap which decorates the throat of the male. Its ears are very short, and its smooth fur is white, mingled with reddish-brown. The Syrian Goat is notable for the extreme length of its ears, which hang downwards, and when the animal raises its head nearly touch the shoulders. The Spanish Goat is destitute of horns, and the Markhur, or Snake-eating Goat, of India and Thibet, is celebrated for its large and exquisitely twisted horns, which are not dissimilar to those of the koodoo, only twisted in the opposite direction.

From time immemorial, the Sheep has been subjected to the ways of mankind, and has provided him with meat and clothing, as well as with many articles of domestic use. The whole carcase of the Sheep is as useful as that of the ox, and there is not a single portion of its body that is not converted to some beneficial purpose. The animal as we now possess it, and which has diverged into such innumerable varieties, is never found in a state of absolute wildness, and has evidently derived its origin from some hitherto undomesticated species. In the opinion of many naturalists, the moufion may lay claim to the parentage of our domestic Sheep, but other writers have separated the moufions from the Sheep, and placed them in a different genus.

SHEEP.—*Ovis aries.* (Southdown.)

In many of its habits, especially in its rock-climbing propensities, it bears a strong resemblance to the Goats, to which animals it is closely allied. Whenever the flock can have access to elevated spots, they may always be seen perched upon the highest and most precipitous spots, and seem to take a curious pleasure in exposing themselves to the risk of being dashed to pieces.

Although the Sheep is generally considered to be a timid animal, and is really so when forced into adverse circumstances and deprived of its wonted liberty, it is truly as bold an animal as can well be seen, and gives many proofs of its courage. If, for example, a traveller comes unexpectedly upon a flock of the little Sheep that range the mountains, they will not flee from his presence, but draw together into a compact body, and watch him with stern and unyielding gaze. Should he attempt to advance, he would be instantly assailed by the rams, which form the first line in such cases, and would fare but badly in the encounter. A dog, if it should happen to accompany the intruder, would probably be at once charged and driven from the spot.

Even a single ram is no mean antagonist when he is thoroughly irritated, and his charge is really formidable. Sheep differ from Goats in their manner of fighting; the latter animals rear themselves on their hind legs, and then plunge sideways upon their adversary, while the former animals hurl themselves forward, and strike their opponent with the whole weight as well as impetus of the body. So terrible is the shock of a ram's charge, that it has been known to prostrate a bull at the first blow. Nor is the Sheep only combative when irritated by opposition, or when danger threatens itself. A Sheep that had been led into a slaughter-house, has been known to turn fiercely upon the butcher as he was about to kill one of its companions, and to butt him severely in order to make him relinquish his grasp of its friend.

The Sheep does not seem to be so intelligent as the Goat, and has a curious habit of always following the individual who happens to be the leader, even though he should rush into danger. A herd of sheep has jumped successively over the top of a precipice, merely because the leader happened to do the same thing. In the East, where the shepherds lead, not drive, the Sheep, they take advantage of this propensity, in managing the vast flocks over which they are set in charge. They have a few pet Sheep which will follow at their heels, and come to the musical call of the shepherd's flute. These privileged animals act as the leaders of the flock, and wherever they go, the rest will follow.

The Sheep breeds freely, producing generally one or two lambs every year, and sometimes presenting its owner with three lambs at a birth. One instance is on record of a wonderfully prolific ewe. She had hardly passed her second year when she produced four lambs. The next year she had five; the year after that she bore twins; and the next year five again. On two successive years she bore twins. Two out of the four and three out of the five were necessarily fed by hand.

We will now advert shortly to some of the principal breeds or varieties of the Sheep.

The Southdown, which is figured at the commencement of this article, affords a good example of the short-wooled breed of domestic Sheep, and is valuable not only for the wool, but for the delicacy of the flesh. This breed derives its name from the extensive Southern Downs; a range of grass-clad chalk hills which pass through Sussex, Surrey, and Kent, in England. These downs are covered with a short, sweet herbage, which is of great service in giving to the flesh of the animal its peculiarly delicate flavor. Multitudes of tiny snails are found upon almost every foot of the down-turf, and are thought by many agriculturists to be very efficacious in fattening and nourishing the animal. By careful crossing and good management, the horns of the Southdown Sheep have been abolished, and the vital energies which would have been expended in developing these appendages, are directed to the nourishment of the body and wool.

This valuable breed of Sheep is not confined to the southern downs of England, but has penetrated to every part of the island where the soil and grass are suitable for its welfare. The Wiltshire downs swarm with these Sheep, which have covered their entire extent with an elaborate interlacing system of Sheep-paths, understood by themselves, but very obscure to human senses. Other parts of England are also in possession of the Southdown Sheep, which is often crossed successfully with some local breed. Indeed, this polled or hornless variety has superseded every horn-bearing breed throughout the kingdom, wherever it can find a habitable locality. In Scotland and elsewhere, the Southdown would not be able to live, as it is of too delicate a nature to withstand the severity of the terrible highland winter; so that the original horned breed still holds its place.

The Wiltshire Sheep have lost their horny armatures by continual crossing with the Southdown, and the result is that a remarkably fine variety has been produced, possessing greater dimensions, a lighter color, and a finer fleece.

Owing to the very great number of the domestic varieties of the Sheep, amounting to nearly thirty distinct breeds, it will be impossible to give more than a mere outline of the most important among them. An example of the long-wooled variety is found in the Leicester Sheep, under which general title are grouped six or eight sub-varieties of the same breed. This animal favors low-lying, level pasturages, and is not so fond of elevated spots as the Welsh and Southdown. The most celebrated breed of Leicester Sheep is that which is known as the Dishley breed.

Of all the domestic varieties of this useful animal, the Spanish, or Merino Sheep, has attracted the greatest attention.

Originally, this animal is a native of Spain, a country which has been for many centuries celebrated for the quantity and quality of its wool. The Merino Sheep, from whom the long and fine Spanish wool was obtained, were greatly improved by an admixture with the Cotswold Sheep of England, some of which were sent to Spain in 1464, and the fleece was so improved by the crossing, that the famous English wool was surpassed by that which was supplied by Spain.

The Merino Sheep is but of little use except for its wool, as, although its mutton is sufficiently good when fattened, it consumes so much food, and occupies so much time in the process of ripening, that it is by no means a profitable animal. The Merino is larger in the limbs than the ordinary English Sheep, and the male is furnished with large spiral horns. The female is generally hornless, but sometimes possesses these appendages on a very small scale. It is liable to bear a black fleece, the sable hue continually making its appearance, even after long and careful crossing. By good management the black tint has been confined to the face and legs, but is ever liable to come out in spots or dashes in the wool. There is always a peculiar hue about the face of a Merino Sheep, not easy to describe, but readily to be recognized whenever seen.

In Spain, the Merinos are kept in vast flocks, and divided into two general heads, the Stationary and the Migratory. The former animals remain in the same locality during the whole of their lives, but the latter are accustomed to undertake regular annual migrations. The summer months they spend in the cool mountainous districts, but as soon as the weather begins to grow cold, the flocks pass into the warmer regions of Andalusia, where they remain until April. The flocks are sometimes ten thousand in number, and the organization by which they are managed is very complex and perfect. Over each great flock is set one experienced shepherd, who is called the "mayoral," and who exercises despotic sway over his subordinates. Fifty shepherds are placed under his orders, and are supplied with boys and intelligent dogs.

Under the guardianship of their shepherds, the Merino Sheep, which have spent the summer in the mountains, begin their downward journey about the month of September; and after a long and leisurely march, they arrive at the pasture-grounds, which are recognized instinctively by the Sheep. In these pasturages the winter folds are prepared, and here are born the young Merinos, which generally enter the world in March, or the beginning of April. Towards the end of that month the Sheep begin to be restless, and unless they are at once removed, will often decamp of their own accord. Sometimes a whole flock will thus escape, and, guided by some marvellous instinct, will make their way to their old quarters unharmed, except, perchance, by some prowling wolf, who takes advantage of the shepherd's absence.

The very young lambs are not without their value, although they furnish no wool, for their skins are prepared and manufactured into gloves, and called by the name of "kid."

Many attempts have been made to naturalize this most important animal, but with little success. At one time the Merino Sheep was in the highest repute, but as it does not combine the mutton-making with the wool-producing power, it has long ago been left unnoticed. It is found that if a Merino be left untouched by the shears for two seasons, the wool will double its length, and be equally fine in texture. In one case, a half-bred Merino was clipped after having been put aside for a whole year, and it was found that her fleece weighed twenty-one pounds, the length of the "pile" being eight inches. The health of the Sheep appears to be uninjured by permitting the animal to retain its coat for two years.

The Australian Sheep, which roams the plains in such vast multitudes, and which furnishes so large a supply of wool to the world's commerce, owes much of its value to a cross with the Merino, several of which animals were imported into Australia by some far-seeing man of business.

The hardy, active, and endurant variety of the domestic Sheep which inhabits the Highlands of Scotland, partake in a great degree of the characters of the wild animal, and demand a specially trained shepherd to watch over them.

Pastoring together in enormous herds, and living upon vast ranges of bleak, hilly country, the light and active HIGHLAND SHEEP is a very intelligent and independent creature, quite distinct in character from the large, woolly, unintellectual animal that lives only in the fold, and is regularly supplied with food by the careful hand of its guardian. It is very sensitive to atmospheric influences, and is so ready in obeying the directions of its own instinct, that a good shepherd, when he first rises in the morning, can generally tell where to find his Sheep, merely by noticing the temperature, the direction of the wind, and the amount of moisture in the air and on the ground. As the Highland Sheep is able to wander to considerable distances from its proper home, the shepherd is aided in his laborious task by several of those wonderful dogs whose virtues and powers have already been recorded in the course of this work.

Much of the disposition of the flock depends upon the temperament of the shepherd. An irritable or impatient man will speedily render his flock almost as unmanageable as his own temper, while he who is gentle and patient, though resolute and firm, will have his charge so thoroughly under control, that his very presence will, in many instances, cause them to do his bidding, even without calling in the aid of his dogs. One prolific source of trouble to the Scotch shepherd is a locomotive propensity which is inherent in Sheep, and which prompts them to quit their own ample boundaries and trespass upon those of their neighbors. Towards evening, when the flocks are inspected, this propensity becomes very annoying, and cannot be restrained by bad managers. Others, who understand the Sheep nature, and shape their conduct accordingly, will quietly move towards the boundary without being followed by the dogs, and by a series of gentle manœuvres entice the Sheep in the proper direction. In a very short time the shepherd establishes the custom, and whenever he moves towards the boundary, the Sheep instinctively recede.

The life of a Highland shepherd is necessarily one of great hardship, and is generally borne with admirable fortitude. In order that the man may feel a personal interest in the flock which is placed under his care, he is permitted to hold a property in a certain number of Sheep, which he may feed on his master's ground without payment. Sometimes he has the little flock of others to watch over as well as those of his own especial charge, so that the neighbors, far and few between as they are, can all have a fellow interest in the welfare of the Sheep. Each shepherd is generally in possession of a little flock consisting of ten to fifty or sixty Sheep, together with pasturage for a few cows.

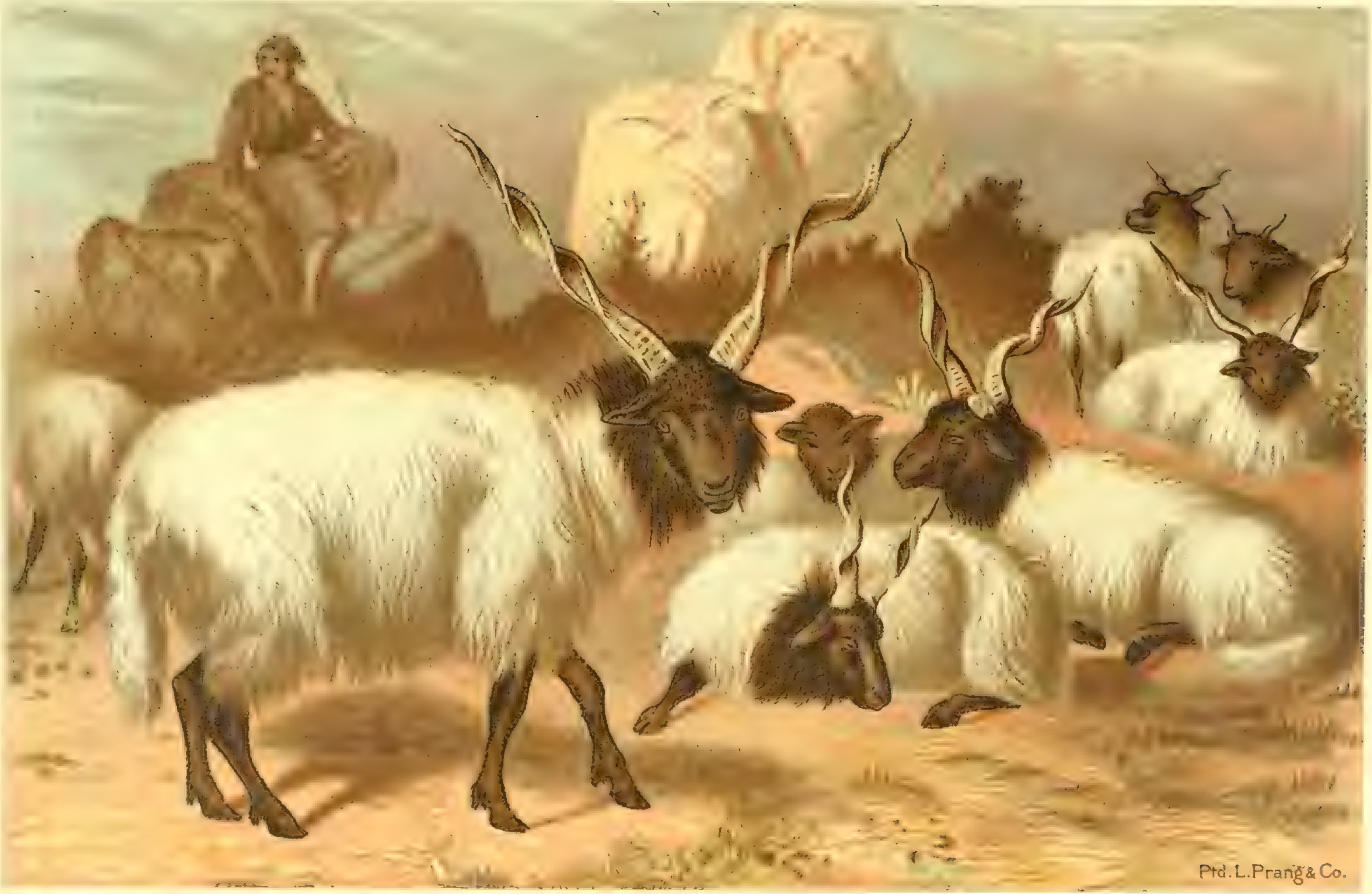
At the Cape of Good Hope a fat-tailed race of Sheep has long been prevalent, and is reared in flocks of considerable size, tended by Hottentot herdsmen. This is a very valuable animal, for it not only furnishes good mutton, together with great quantities of fat, but, when young, supplies its owner with beautifully soft and warm garments. The skins of the **Cape Sheep** are prepared for use by being cleaned, dressed, and sewn together; and are of such excellent quality that they form a warmer coverlet than could be obtained from any other material. Their outward show is not at all inferior to their quality; for they are so smooth and soft that few persons would guess that they had once formed part of the natural covering of a Sheep. The fat of these animals is mostly collected in the tail and hinder quarters, and is peculiarly soft when removed from the animal, being in an almost semi-fluid state. It is thought a great delicacy, and is also in great request for the manufacture of soap.

The Afghan Fat-tailed Sheep is remarkable not only for the extremely large and fatty tail, but for the delicate and silken texture of its wool. The coat of this animal is largely used in local manufactures, and a very considerable amount is also exported into neighboring countries. Pelisses, caps, and carpets of various kinds are the chief articles into which this soft and valuable wool is manufactured. There are also several herds of Fat-tailed Sheep in different parts of India.

One of the most important of the ovine group is the **Cretan, or Wallachian Sheep**, remarkable for the enormous development and magnificent formation of its horns.

This splendid animal is a native of Western Asia and the adjacent portions of Europe, and is very common in Crete, Wallachia, and Hungary. The horns of the Wallachian Sheep are strikingly like those of the Koodoo, or the Addax, their dimensions being proportionately large, and their form very similar. The first spiral turn is always the largest, and the horns are not precisely the same in every specimen. As a general rule, they rise boldly upwards from the skull, being almost perpendicularly set upon the head; but in others, there is considerable variety in the formation of the spirals and the direction of the tips. In one specimen which was preserved in the gardens of the Zoological Society, the first spiral of the horns was curved downwards, and their tips were directed towards the ground.

The fleece of this animal is composed of a soft, woolly undercoat, covered with and protected by long drooping hairs. The wool is extremely fine in quality, and is employed in the manufacture of warm cloaks, which are largely used by the peasantry, and which are so thick and warm that they defend the wearer against the bitterest cold. Even in the depth of



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WALLACHIAN SHEEP.

winter the shepherd can safely lie on the ground wrapped in his sheep-skin mantle. For this purpose, the skin is dressed without removing the wool.

In a state of nature, all Sheep are furnished with a pair of horns, but in the cultivated races these ornaments generally become obliterated. A curious exception to this principle occurs in the many-horned varieties which are found in several parts of Asia, and which sometimes possess as many as three distinct pairs of horns. The additional or accessory appendages are slighter in their make than the true horns, and are generally placed on the upper parts of the head. Their tips almost invariably take an upward direction, while the true horns generally curl downward, and retain a portion of the tendency to a spiral form.

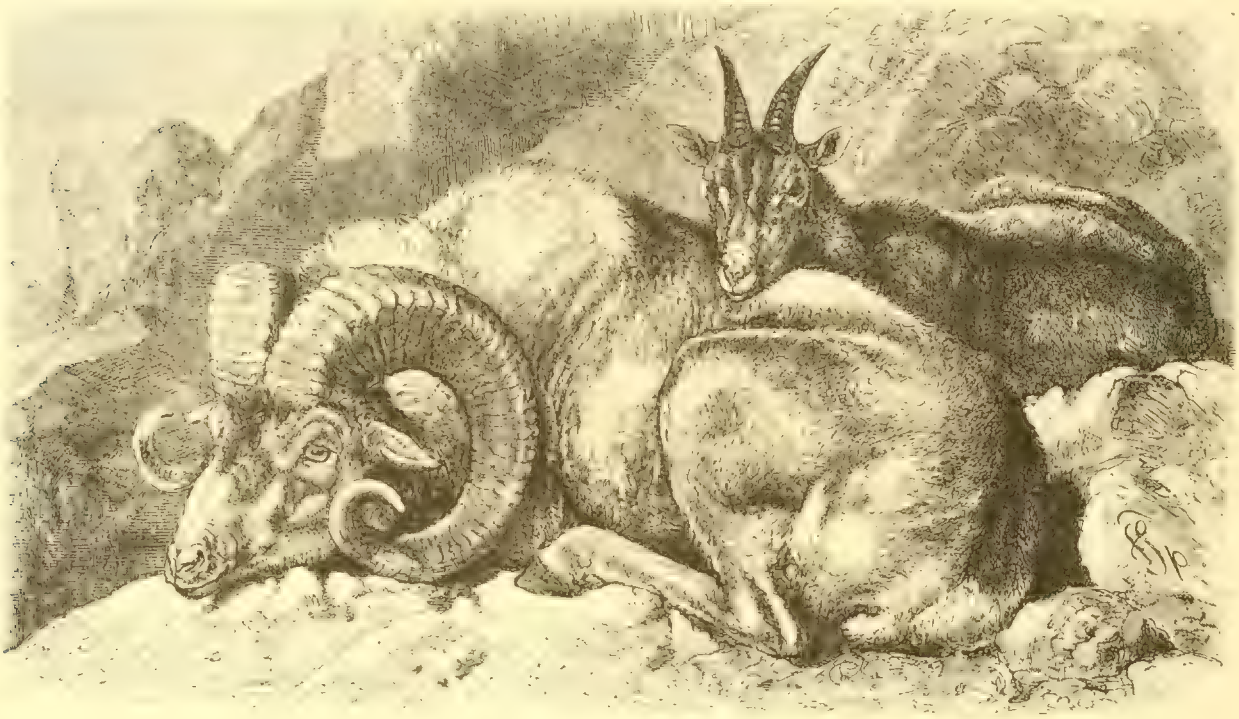
THE SARDINIAN MOUFLON.—*Ovis musimon.*

Giants among the ovine race, the Mouflons tower far above every other variety of the Sheep. These animals may be found in several portions of the world, several species being inhabitants of Asia, one of Sardinia and Corsica, and one of Northern America. Of these gigantic Sheep, the Argali of Siberia is the most conspicuous, as well for general dimensions, as for the enormous size of the horns.

The Argali is nearly as large as a moderately sized ox, being four feet high at the shoulders and proportionately stout in its build. The horns of a full-grown male Argali are very nearly four feet in length if measured along the curve, and at their base are about nineteen inches in circumference. They spring from the forehead, and after rising perpendicularly for a short distance, curve boldly downwards until they reach below the chin, when they recurve upwards and come to a point. The surface of the horns is covered with a series of deep grooves set closely together, and extending almost to the very extremities. Firmly as these weapons are fixed upon the animal's forehead, they are sometimes fairly broken off in the fierce conflicts which these creatures wage with each other when they fight for the possession of some desirable female. These broken horns are not suffered to lie unobserved on the ground, but are soon utilized by the foxes and other small mammalia which inhabit the same country, and converted at once into dwelling-houses, where they lie as comfortably as the hermit-crab in a whelk-shell. Man also makes use of these horns, by converting them into various articles of domestic economy.

It is a mountain-loving animal, being found on the highest grounds of Southern Siberia and the mountains of Central Asia, and not fond of descending to the level ground.

Its power of limb and sureness of foot are truly marvellous when the great size of the animal is taken into consideration. If disturbed while feeding in the valley, it makes at once for the rocks, and flies up their craggy surfaces with wonderful ease and rapidity. Living in such localities, they are liable to suffer great changes of temperature, and are sometimes wholly enveloped in the deep snow-drifts that are so common upon mountainous regions. In such cases they lie quietly under the snow in a manner similar to that which has already been related of the hare under the same circumstances, and are able to continue respiration by means of a small breathing-hole through the snow. For these imprisoned Argalis the hunters eagerly search, as the animal is deprived of its fleet and powerful limbs, and is forced ignominiously to succumb to the foe, who impales him by driving his spear through the snow into the creature's body. Like others of the same group, it is gregarious, and lives in small flocks.



ARGALI.—*Caprovis argali.*

Another example of the Mouflons may be found in the Big-horn, or Rocky Mountain Sheep, of California.

This animal is not at all uncommon in its native land, where it may be found in little troops of twenty or thirty in number, inhabiting the craggiest and most inaccessible rocks. From these posts of vantage they never wander, but are content to find their food upon the little knolls of green herbage that are found sprinkled among the precipices, without being tempted by the verdant expanse of the plains below. Before they became acquainted with the destructive powers of mankind, they were very fearless, and would curiously survey those who approached their lofty abodes. Now, however, they are peculiarly shy and suspicious, and at the sight of a man they blow their warning whistle, and immediately take refuge in the recesses of the rocks. When wounded, unless the injury is one that carries immediate death with it, the animal makes the best of its way into one of its retreats, and dying there, is useless to its slayer.

The flesh of the Big-horn is remarkably excellent, and is said to be superior to that of the native deer. When full-grown, a Big-horn measures about three feet six inches in height at the shoulders, and the horns are about the same length, thus preserving the same proportions of stature and length of horn as has already been noticed in the Argali of Siberia. The color of the animal is extremely variable, changing according to the season of the year.

A full-grown adult male of this species is a marvel of power; its horns are said to be capable of receiving the most violent shocks when the animal is forced to leap down any considerable height. The female is less in size, and has smaller horns. A Big-horn of the largest size will weigh three hundred and fifty pounds. A magnificent pair are in the American Museum.

BIG-HORN.—*Capra montana.*

Closely allied to the two preceding animals, the Aoudad, or Bearded Argali, may be easily distinguished from them by the heavy mane which commences at the throat and falls as far as the knees.

The Aoudad is a native of Northern Africa, and is a mountain-dweller, inhabiting only the loftiest and most inaccessible precipices. It is commonly found in the lofty woods of the Atlas mountains, where it disports itself with as much ease and absence of fear as if it were quietly standing on level ground. Like the argali and big-horn, it is remarkably active, as needs for an animal whose life is cast among the terrible precipices of the loftiest mountain ranges. The height of the Aoudad is rather more than three feet at the shoulder, so that it is a really large animal, although not of such gigantic proportions as the argali. The horns are about two feet in length. Round the fore-legs a quantity of long hair is placed, like ruffles, just above the knee, a peculiarity which has earned for the creature the French name of *Mouflon à manchettes.* It seems to be a lively but rather petulant animal, full of curiosity, and gentle in its disposition.

Sub-family *Nemorhedinæ* includes two genera and ten species. They are goat-like Antelopes. The typical genus, *Nemorhedus*, has nine species in Asia. The other genus has but one species, the Rocky Mountain Goat (*Aplocerus montanus*), and is wholly confined to America, and the narrow limits of the Rocky Mountains. This is a true Antelope, in all essential features and affinities, though having something of the aspect of the goat, from whence it derives its trivial name.

AOUDAD.—*Ammotragus tragelaphus.*

In some respects this creature resembles the chamois of the Alps. Its small re-curved horns are especially like those of the latter. Its nose is hairy and ovine in aspect. It has no muffle, and no tear-bag. The under fur is short and woolly, and the outer fur is long and pendant.

Next to the musk sheep this is the rarest of North American animals. It inhabits the most inaccessible cliffs of the Rocky Mountains. Only during the last ten years has it been taken. The extreme difficulty in recovering the body even if the hunter is successful in shooting it, has hitherto proved insuperable. Its habits are entirely unobserved. The long and rugged pathway along which the hunter has to pass proves too fatiguing, and even now it is a rare animal in collections. The Central Park Museum has a fine example. The pelt of this is pure white. The horns and hoofs are jet black.

One more sub-family, distinguished by being wholly American, and having one genus and one species only, is the *Antilocaprinæ*.

The Prong-horn Antelope (*Antilocapra americana*) is a familiar species to the visitor of the great Western plains. The title prong-horn relates to the small branch of the horn. About the time of the settlement of California it was very abundant on the great plains. Its favorite range is along the barren or naked plains, avoiding the timber lands, as it depends on its fleetness to escape from enemies. The eye of this creature is larger than that of any other mammal of its size, being nearly that of the elephant. It has a gentle expression, rivalling the gazelle in its winning aspect.

Long before the truth was known to Science, hunters had observed that the horns of this animal were dropped, like those of the deer; yet no definite information was elicited or recorded.

In 1848, Dr. Canfield, of California, sent the information to the Smithsonian Institute, but the circumstance was so contrary to the usual or known examples, that no special interest was awakened.

In 1855, Mr. Bartlett, of the London Zoological Gardens, attested the fact by actual observation in the gardens. In February following Dr. Canfield's paper was published. The creature has a hollow, deciduous horn, which envelops a persistent core, a process of the skull. This shell is true horn, and has the same general system of growth as other horns, although it is cast annually, like antlers of deer.

ROCKY MOUNTAIN GOAT.—*Aplocerus americanus.*

It thus reveals an intermediate link between the two principal groups of hollow-horned and solid-horned ruminants. The lower portion of the horn only is hollow—this is quite flat, but the point is round and becomes polished by wear. A singular characteristic is seen in the presence of numerous cutaneous glands—eleven in number—which secrete a pungent odor. Those below the ears, particularly, are potent.

The flesh is much prized, having the reputation of being superior to either beef or venison. In fleetness it is said to excel all other animals of the plains, but soon loses "wind," and is easily captured. It is particularly gregarious. Canfield says it is remarkably salacious, exceeding even the goat in this respect.

The Prong-horn is easily tamed, and soon loses its shyness and timid action. In leaping it makes enormous horizontal distances. In common with all the hollow-horned ruminants, it has a gall bladder, which is wanting in the deer family. The hair is quite unique in its structure; it is very light, each hair being a tube, flexible, and soft as velvet.

GIRAFFES.

TALLEST of all earthly dwellers, the GIRAFFE erects its stately head far above any animal that walks the face of the globe. It is an inhabitant of various parts of Africa, and is evidently a unique being, comprising in itself an entire tribe. The color of the coat is slightly different in the specimens which inhabit the northern and the southern portions of Africa, the southern animal being rather darker than its northern relative.

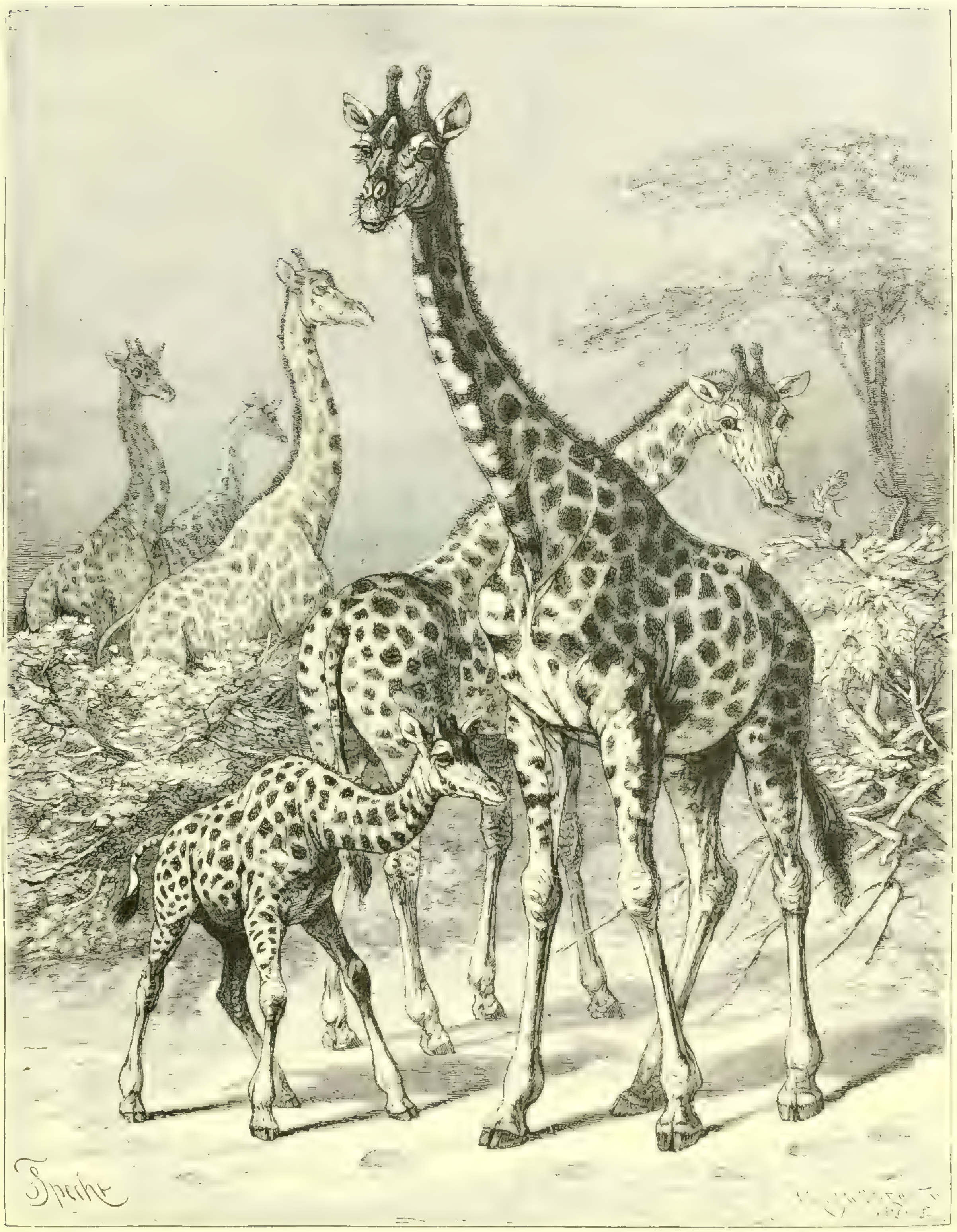
The height of a full-grown male Giraffe is from eighteen to twenty feet, the female being somewhat less in her dimensions. The greater part of this enormous stature is obtained by the extraordinarily long neck, which is nevertheless possessed of only seven vertebræ, as in ordinary animals. Those bones are, however, extremely elongated, and their articulation is admirably adapted to the purpose which they are called upon to fulfil. The back of the Giraffe slopes considerably from the shoulders to the tail, and at first sight the fore-legs of the animal appear to be longer than the hinder limbs. The legs themselves are, however, of equal length, and the elevation of the shoulder is due to the very great elongation of the shoulder-blades. Upon the head are two excrescences which resemble horns, and are popularly called by that name. They are merely growths or developments of certain bones of the skull, somewhat similar to the bony cores on which the hollow horns of the oxen and antelopes are set. These quasi horns are covered with skin, and have on their summits a tuft of dark hair. On the forehead, and nearly between the eyes, a third bony projection is seen, occupying the same position that was traditionally accredited to the horn of the unicorn.

The singular height of this animal is entirely in accordance with its habits and its mode of acquiring food. As the creature is accustomed to feed upon the leaves of trees, it must necessarily be of very considerable stature to be able to reach the leaves on which it browses, and must also be possessed of organs by means of which it can select and gather such portions of the foliage as may suit its palate. The former object is gained by the great length of the neck and legs, and the latter by the wonderful development of the tongue, which is so marvellously formed that it is capable of a considerable amount of prehensile power, and can be elongated or contracted in a very wonderful manner. Large as is the animal, it can contract the tip of its tongue into so small a compass that it can pass into the pipe of an ordinary pocket-key, while its prehensile powers enable its owner to pluck any selected leaf with perfect ease. In captivity the Giraffe is rather apt to make too free a use of its tongue, such as twitching the artificial flowers and foliage from ladies' bonnets, or any similar freak.

For grazing upon level ground the Giraffe is peculiarly unfitted, and never attempts that feat excepting when urged by hunger or some very pressing cause. It is, however, perfectly capable of bringing its mouth to the ground, although with considerable effort and much straddling of the fore-legs. By placing a lump of sugar on the ground, the Giraffe may be induced to lower its head to the earth, and to exhibit some of that curious mixture of grace and awkwardness which characterizes this singular animal.

In its native country its usual food consists of the leaves of a kind of acacia, named the Kameel-dorn, or Camel-thorn (*Acacia giraffæ*). The animal is exceedingly fastidious in its appetite, and carefully rejects every thorn, scrupulously plucking only the freshest and greenest leaves. When supplied with cut grass, the Giraffe takes each blade daintily between its lips, and nibbles gradually from the top to the stem, after the manner in which we eat asparagus. As soon as it has eaten the tender and green portion of the grass, it rejects the remainder as unfit for camelopardine consumption. Hay, carrots, onions, and different vegetables form its principal diet while it is kept in a state of captivity.

The Giraffe is a gentle and playful animal, readily attaching itself to its companions or its keepers, and trying to attract attention by sundry little coquetries. It is full of curiosity, and seems to be greatly gratified by the advent of many visitors, whose costume and general appearance it investigates with an air of great interest. There is something peculiarly mild



GIRAFFE.

and pleasant in the full, round, dark eye of the Giraffe, whose gaze is really fascinating to those who feel attracted by a mild and gentle expression of soul. Even the ruthless hunter has felt himself overcome by the glances of the Giraffe's dark, expressive eye, as the poor animal lay unresistingly and silently on the ground, watching its destroyer with reproachful but not vengeful gaze.

As far as is at present known, the Giraffe is a silent animal, like the eland and the kangaroo, and has never been heard to utter a sound, even when struggling in the agonies of death. When in its native land it is so strongly perfumed with the foliage on which it chiefly feeds, that it exhales a powerful odor, which is compared by Captain Cumming to the scent of a hive of heather honey.

Although an inoffensive and most gentle creature, it is not destitute of aggressive capabilities, and can defend itself against ordinary foes, such as the predaceous carnivora which inhabit the same land. In defending itself it does not bring its head within reach of its enemy, but delivers a shower of kicks with such lightness and celerity, that it has been known even to daunt the lion from the attack. When, however, the lion can steal unobserved upon the Giraffe, and especially when it unites with others of its own race in the pursuit of the huge prey, it brings down the Giraffe by dint of sheer bodily strength and sharpness of tooth and claw.

GIRAFFE GRAZING UPON LEVEL GROUND.

To man it falls an easy prey, especially if it can be kept upon level ground, where a horse can run without danger. On rough soil, however, the Giraffe has by far the advantage, as it leaps easily over the various obstacles that lie in its way, and gets over the ground in a curiously agile manner. It is not a very swift animal, as it can easily be overtaken by a horse of ordinary speed, and is frequently run down by native hunters on foot. When running, it progresses in a very awkward and almost ludicrous manner, by a series of frog-like leaps, its tail switching and twisting about at regular intervals, and its long neck rocking stiffly up and down in a manner that irresistibly reminds the observer of those toy birds whose heads and tails perform alternate obeisances by the swinging of a weight below. As the tail is switched sharply hither and thither, the tuft of bristly hairs at the extremity makes a hissing sound as it passes through the air.

The Giraffe is easily traced by its "spoor," or footmarks, which are eleven inches in length, pointed at the toe and rounded at the heel. The pace at which the animal has gone is ascertained by the depth of the impression, and by the scattering of disturbed soil along the path.

Besides the usual mode of hunting and stalking, the natives employ the pitfall for the purpose of destroying this large and valuable animal. For this purpose a very curiously constructed pit is dug, being about ten feet in depth, proportionably wide, and having a wall or bank of earth extending from one side to the other, and about six or seven feet in height. When the Giraffe is caught in one of these pits, its fore-limbs fall on one side of the wall, and its hind legs on the other, the edge of the wall passing under its abdomen. The poor creature is thus balanced, as it were, upon its belly across the wall, and in spite of all its plunging, is unable to obtain a foothold sufficiently firm to enable it to leap out of the treacherous cavity into which it has fallen. The pitfalls which are intended for the capture of the hippopotamus and the rhinoceros are furnished with a sharp stake at the bottom, which impales the luckless animal as it falls; but it is found by experience that, in the capture of the Giraffe, the transverse wall is even more deadly than the sharpened pike.

In spite of the great size of the Giraffe, and its very peculiar formation, it is not nearly so conspicuous an animal as might be imagined. The long neck and dark skin of the creature are so formed that they bear a close resemblance to the dried and blasted stems of the forest trees. So close is the resemblance, that even the keen-eyed natives have been known to mistake trees for Giraffes, and *vice versâ*.

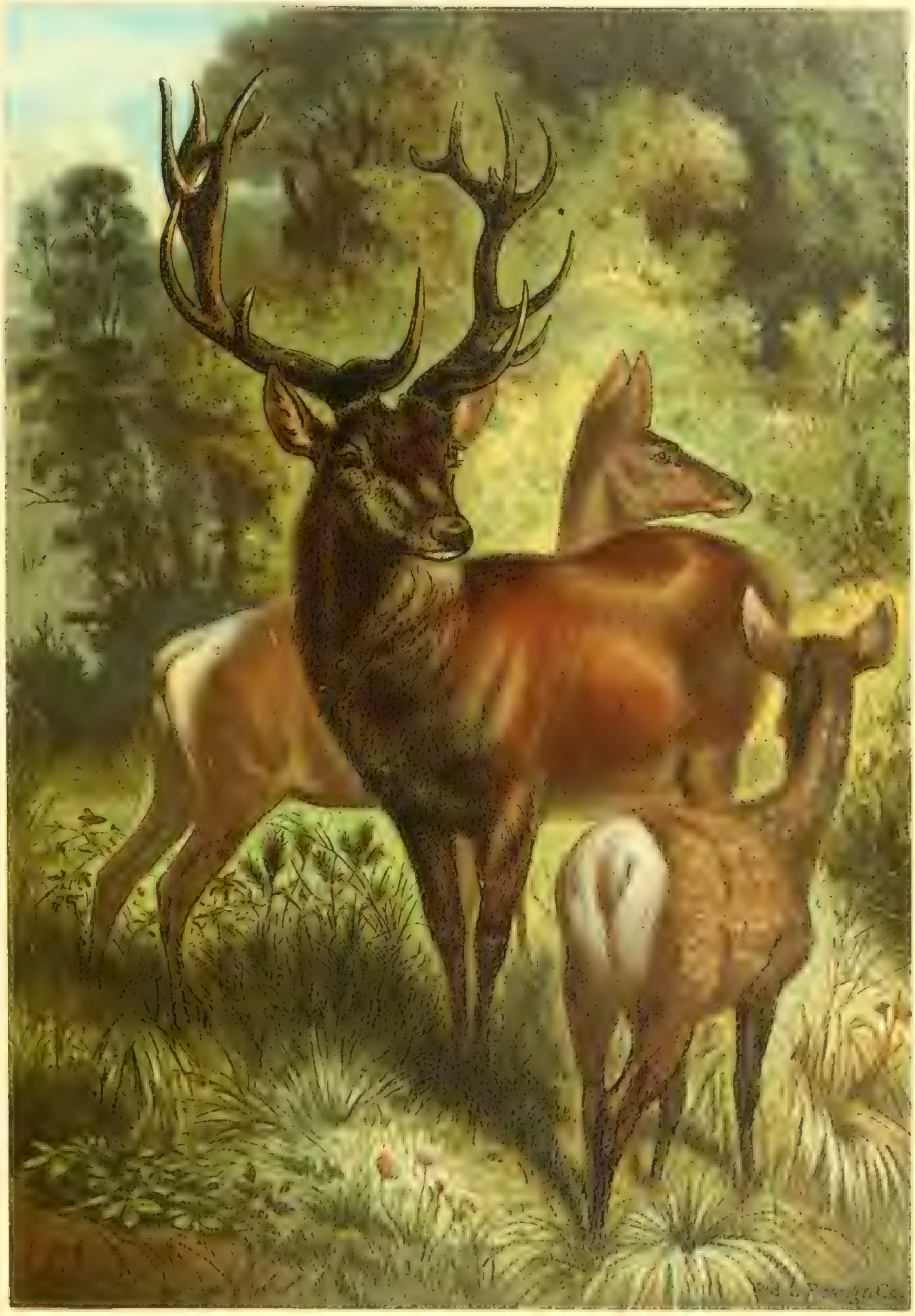
The Giraffe is generally found in little herds, sometimes only five or six in number, and sometimes containing thirty or forty members, the average being about sixteen. These animals are found of all sizes and both sexes, each herd being under the guidance of one old experienced male, whose dark chestnut hide and lofty head render him conspicuous above his fellows. These herds are always found either in or very close to forests, where they can obtain their daily food, and where they can be concealed from their enemies among the tree-trunks, to which they bear so close a resemblance.

As the hide of the Giraffe is enormously thick, the animal is not easily to be killed by the imperfect weapons with which the native tribes are armed, and does not readily yield its life even to the bullets of the white man. It is but seldom that a single shot has laid low one of these animals, and in these rare cases the balls were of heavy calibre and made of hardened metal. The flesh of the Giraffe is considered to be good, when rightly prepared, and its marrow is thought to be so great a delicacy that the natives eagerly suck it from the bones as they are taken from the animal. When cooked, it is worthy of a place on a royal table. The flesh is well fitted for being made into jerked meat. The thick, strong hide, is employed in the manufacture of shoe-soles, shields, and similar articles.

DEER.

THE characteristics by which the different groups of DEER are distinguished, as well as those which mark out the genus and species, are not at all self-evident, but are variously given by various zoologists. Most writers base their classification solely upon the horns, but as these ornaments are not to be found in every specimen, nor at every season, such a classification would evidently be impracticable in many cases. Moreover, the same species, or even the same individual, bears horns of quite a different aspect at different times of its life, while several species which are clearly distinct are furnished with closely similar horns. Bearing these difficulties in mind, Mr. Gray has judiciously employed several characteristics in his systematic arrangement of the Deer, and for that purpose has made use of the form and extent of the muzzle, the position and presence of glands on the hind legs, the general form of the horns, and the kind of hair which forms the fur.

From the antelopes the Deer are readily distinguished by the character of the horns, which only belong to the male animals, are composed of solid bony substances, and are shed and renewed annually during the life of the animal. The process by which the horns are developed, die, and are shed, is a very curious one, and deserves a short notice



SELMAR HESS, PUBLISHER, N. Y

STAG, OR RED DEER.

before we proceed to consider the various species of Deer which will be noticed in the present work. For a familiar instance, we will take the Common Stag, or Red Deer of Europe.

In the beginning of the month of March he is lurking in the sequestered spots of his forest home, harmless as his mate and as timorous. Soon a pair of prominences make their appearance on his forehead, covered with a velvety skin. In a few days these little prominences have attained some length, and give the first indication of their true form. Grasp one of these in the hand and it will be found burning hot to the touch, for the blood runs fiercely through the velvety skin, depositing at every touch a minute portion of bony matter. More and more rapidly grow the horns, the carotid arteries enlarging in order to supply a sufficiency of nourishment, and in the short period of ten weeks the enormous mass of bony matter has been completed. Such a process is almost, if not entirely, without parallel in the history of the animal kingdom.

When the horns have reached their due development, the bony rings at their bases, through which the arteries pass, begin to thicken, and by gradually filling up the holes, compress the blood-vessels, and ultimately obliterate them. The velvet now having no more nourishment, loses its vitality, and is soon rubbed off in shreds against tree-trunks, branches, or any inanimate object. The horns fall off in February, and in a very short time begin to be renewed. These ornaments are very variable at the different periods of the animal's life, the age of the Stag being well indicated by the number of "tines" upon his horns.

The Ruminating Animals form one order, according to some authors; and this group is regarded as one of the most clearly defined of any of the animal kingdom. Two divisions are recognized, the Hollow-horn, and the Solid-horn Ruminants.

The Camel family (*Camelidæ*) is represented on this continent by the Llama, Guanaco, and like forms in South America. The Camel family had numerous representatives in earlier geological time, all now extinct save the few above mentioned South American forms. There are several species clearly recognized by their bony remains in the Western Territories.

An extinct genus, *Palauchenia*, found in Mexico, had species as large as the present living Camel of the Old World. Another genus, *Aucheniæ*, was represented by a species considerably larger—the remains found in California. The extinct genus *Procamelus*, is found in the miocene formations of Virginia. Several other large Camels of different genera are known to have inhabited the Western plains; their bones being found in the earth.

Great numbers of other animals, more or less allied to the Camels and Deer, are found in the Western Territories.

FAMILY *Cervidæ*—the Deer—according to Wallace, has eight genera and fifty-two species. They are found very generally distributed, excepting in Africa, where they seem to be replaced by antelopes. There are no Deer in Africa, excepting on the borders of the Mediterranean Sea.

The Deer have antlers, or solid horns, that drop yearly, giving chance for extra growth during the time of renewal. The female has no antlers save in one instance, the Reindeer. The Musk Deer has no antlers.

The Moose (*Alce americanus*) is now very much reduced in numbers; a few are yet seen in Northern Maine and New York State. Unlike the other Deer, this animal has a short neck, which is unfitted for grazing. It feeds on the tender branches of trees. The elongated snout indicates this habit. Like the nose of the camelopard, it is quite prehensile; seizing the branches and twisting them off for food. The Indians noticed this habit as distinguishing the animal from other Deer, and called it Moose, meaning *wood-eater*.

The Moose wood, or Pennsylvania maple, is so named from its being a favorite food of the Moose. The Moose is very timid and wary, and moves with great celerity through the woodland and underbrush for so large an animal.

It stands high, measuring about seven feet high at the shoulders.

Grand examples of this great Deer, with female and young, are in the American Museum, Central Park. In view of the quite probable extinction of these animals at no distant day, it is gratifying to know that fine specimens are preserved.

We give an admirable full page illustration of the Moose.

The first group of Deer is that which includes the Deer of the snowy regions, and comprehends two genera, the Elk and the Reindeer.

The Moose, or Elk, is the largest of all the deer tribe, attaining the extraordinary height of seven feet at the shoulders, thus equalling many an ordinary elephant in dimensions. The horns of this animal are very large, and widely palmated at their extremities, their united weight being so great as to excite a feeling of wonder at the ability of the animal to carry so heavy a burden. It does not reach its full development until its fourteenth year. The muzzle is very large and is much lengthened in front, so as to impart a most unique expression to the Elk's countenance. The color of the animal is a dark brown, the legs being washed with a yellow hue. It is a native of Northern Europe and America, the Moose of the latter continent and the Elk of the former being one and the same species.

As the flesh of the Elk is palatable, and the skin and the horns extremely useful, the animal is much persecuted by hunters. It is a swift and enduring animal, although its gait is clumsy and awkward in the extreme. The only pace of the Elk is a long, swinging trot; but its legs are so long and its paces so considerable, that its speed is much greater than it appears to be. Obstacles that are almost impassable to a horse, are passed over easily by the Elk, which has been known to trot uninterruptedly over a number of fallen tree-trunks, some of them five feet in thickness. When the ground is hard and will bear the weight of so large an animal, the hunters are led a very long and severe chase before they come up with their prey; but when the snow lies soft and thick on the ground, the creature soon succumbs to its lighter antagonists, who invest themselves in snow-shoes and scud over the soft snow with a speed that speedily overcomes that of the poor Elk, which sinks floundering into the deep snow-drifts at every step, and is soon worn out by its useless efforts.

It is as wary as any of the Deer tribe, being alarmed by the slightest sound or the faintest scent that gives warning of an enemy. As the Elk trots along, its course is marked by a succession of sharp sounds, which are produced by the snapping of the cloven hoofs, which separate at every step, and fall together as the animal raises its foot from the ground.

Generally, the Elk avoids the presence of man, but in some seasons of the year he becomes seized with a violent excitement, that finds vent in fighting with every living creature that may cross his path. His weapons are his horns and fore-feet, the latter being used with such terrible effect that a single blow is sufficient to slay a wolf on the spot. The enormous horns form no barrier to his progress through the woods, for when the Elk runs, he always throws his horns well back upon his shoulders, so that they rather assist than impede him in traversing the forest glades. The Elk is a capital swimmer, proceeding with great rapidity, and often taking to the water for its own amusement. During the summer months of the year it spends a considerable portion of its time under water, its nose and horns being the only parts of its form which appear above the surface. Even the very young Moose is a strong and fearless swimmer.

The skin of the Elk is extremely thick, and has been manufactured into clothing that would resist a sword blow and repel an ordinary pistol ball. The flesh is sometimes dressed fresh, but is generally smoked like hams, and is much esteemed. The large muzzle or upper lip is, however, the principal object of admiration to the lovers of Elk flesh, and is said to be rich and gelatinous when boiled, resembling the celebrated green fat of the turtle.

When captured young, the Elk is very susceptible of domestication, and in a few hours will learn to distinguish its keeper, and to follow him about with playful confidence. If, however, the animal has attained to a moderate growth, it becomes fierce, surly, and dangerous. "In the middle of the night," says Audubon, speaking of a young captive Elk, "we were awakened by a great noise in the hovel, and found that as it had in some measure recovered from its terror and state of exhaustion, it began to think of getting home, and was much enraged at finding itself so securely imprisoned. We were unable to do anything with it, for if we merely approached our hands to the opening of the hut, it would spring at us with the greatest fury, roaring and erecting its mane in a manner that convinced us of the futility of all attempts to save it alive. We threw to it the skin of a deer, which it tore to pieces in a moment. This individual was a yearling, and about six feet high."

MOOSE, OR ELK.

By careful attention, however, and good training, the Elk can be used as a beast of carriage or burden, and from its great size and power is extremely valuable in that capacity.

Two varieties of **Reindeer** inhabit the earth ; the one, called the Reindeer, being placed upon the northern portions of Europe and Asia, and the other, termed the Caribou, being restricted to North America. We will first describe the European variety.

This animal is very variable in dimensions ; the color is also variable, according to the season of year. In winter the fur is long, and of a grayish-brown tint, with the exception of the neck, hinder quarters, abdomen, and end of nose, which are white. In the summer, the gray-brown hair darkens into a sooty brown, and the white portions become gray.

REINDEER.—*Rangifer tarandus.*

In its wild state the Reindeer is a migratory animal, making annual journeys from the woods to the hills, and back again, according to the season. Their chief object in leaving the forests in the summer months appears to be their hope of escaping the continual attacks of mosquitoes and other insect pests that are found in such profusion about forest land. The principal plague of the Reindeer is one of the gad-flies, peculiar to the species, which deposits its eggs in the animal's hide, and subjects it to great pain and continual harassment. Even in the domesticated state the Reindeer is obliged to continue its migrations, so that the owners of the tame herds are perforce obliged to become partakers in the annual pilgrimages, and to accompany their charge to the appropriate localities.

The nature of the persecutions to which the Reindeer is continually subjected is well told by a correspondent to the *Field* newspaper: "The herd looked very miserable, as I thought ; there is nothing of the antlered monarch about the Reindeer, but a careworn, nervous expression, which I do not wonder at, considering how they are bullied. There are creatures which sting them all over, and creatures which lay their eggs in their ears and nostrils and make themselves comfortable under their skin; and wolves, and gluttons, and dogs, and Laps—in short, I know of no animal so persecuted (barring a rat, and he has his revenge, and lives on the fat of the land), and nothing in return except snow, and moss which tastes like dry sponge."

The Laplanders place their chief happiness in the possession of many Reindeer, which are to them the only representatives of wealth. Those who possess a herd of a thousand or more are reckoned among the wealthy of their country; those who only own a few hundreds are considered as persons of respectability; while those who only possess forty or fifty are content to act as servants to their richer countrymen, and to merge their little herd in that of their employers. In the waste, dry parts of Lapland, grows a kind of white lichen, which forms the principal food of the Reindeer during winter, and is therefore highly prized by the natives. Although this lichen may be deeply covered with snow, the Reindeer is taught by instinct to scrape away the superincumbent snow with its head, hoofs, and snout, and to lay bare the welcome food that lies beneath. Sometimes the surface of the snow is frozen so firmly that the animal can make no impression; and under these circumstances it is in very poor case, many of the unfortunate creatures dying of starvation, and the others being much reduced in condition.

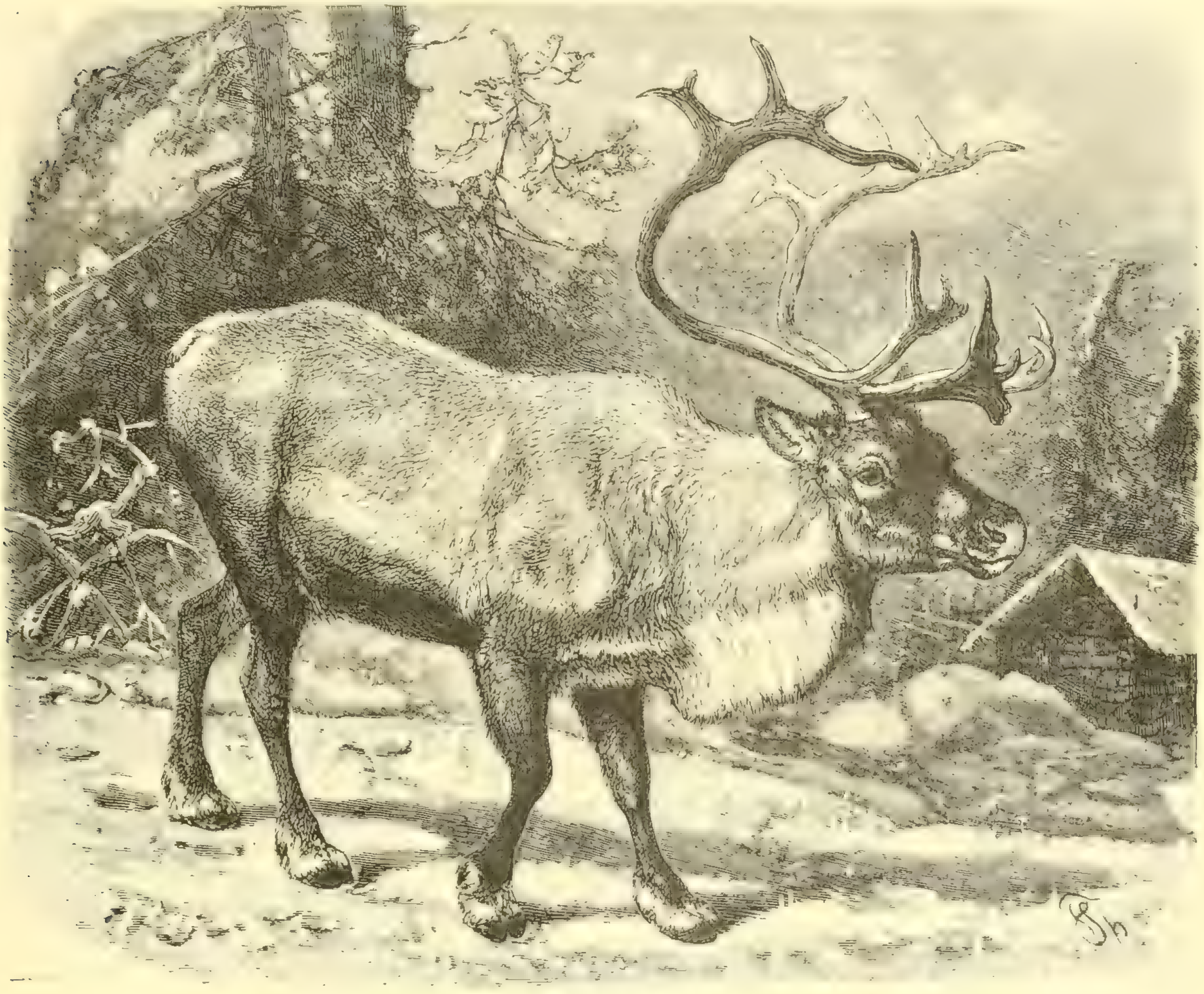
The Reindeer is extensively employed as a beast of draught and carriage, being taught to draw sledges and to carry men or packages upon its back. Each Reindeer can draw a weight of two hundred and fifty or even three hundred pounds, its pace being between nine and ten miles per hour. There is, however, a humane law which prohibits a weight of more than one hundred and ninety pounds upon a sledge, or one hundred and thirty upon the back. It is a very enduring animal, as it is able to keep up this rate of progress for twelve or more hours together.

The eyes of the Reindeer are very quick, and his hearing also acute; but his sense of smell is more wonderfully developed than either of the other senses.

THE CARIBOU, or American variety of the Reindeer, is a large animal, measuring three feet six inches in height at the shoulder when adult. Although it is specifically identical with the European Reindeer, it has never yet been brought under the sway of man, and trained to carry his goods or draw his sledges. Should it be employed for these purposes, it would be a most valuable servant, for it is a very strong as well as an enduring animal, leading its pursuers a chase of four or five days, and often eventually making good its escape. A small herd of these animals was chased continually for a week; and after tiring out their original hunters, lost two of their number by the bullets of some fresh hunters who took up the chase. Whenever practicable, the Caribou makes for the frozen surface of the lakes, and is then sure to escape, although the manner of doing so is ludicrously clumsy. Rushing recklessly forward, the Caribou will be suddenly startled by some object in its front; and on attempting to check its onward career, falls on the ice in a sitting posture, and in that attitude slides for a considerable distance before it can stop itself. Recovering its feet, it then makes off in another direction, and gets over the ground with such celerity that the hunters always yield the chase whenever the animal gets upon the ice.

During the greater part of the year, the flesh of the Caribou is dry and tasteless, and when eaten seems to have no effect in satiating hunger. There is, however, a layer of fat, sometimes two or three inches in thickness, that lies under the skin of the back and croup in the male, and is technically termed the *depouillé*. This fatty deposit is so highly esteemed that it outweighs in value the remainder of the carcase, including skin and horns. The marrow is also remarkably excellent, and is generally eaten raw. When pounded together with the *depouillé* and the dried flesh it makes the best pemmican, a substance which is invaluable to the hunter. Even the horns are eaten raw while they are young, soft, and in the velvet. The skin is very valuable, especially when taken from the young animal; and when properly dressed is an admirable defence against cold and moisture. With the addition of a blanket, a mantle of Caribou skins is an ample protection for any one who is forced to bivouac in the snow.

The Caribou lives in herds, which vary from ten to three hundred in number. As it is so valuable an animal, it is subject to great persecution at the hands of white and red hunters, who have very ingenious modes of trapping or stalking this wary and swift Deer. The most ingenious plan is that which is employed by the Esquimaux, who dig a large hole in the ground, about five feet in depth, and capable of holding several Deer. They then cover the aperture with a slab of ice or frozen snow, which is balanced on two pivots in such a way that when a Deer treads upon the treacherous floor it suddenly gives way, tilts him into the pit, and resumes its position in readiness for another victim. Another plan is to make a large inclosure, at least a mile in circumference, and to drive the Deer into its fatal precincts. The space within the inclosure is formed into numerous alleys, in each of which are long nooses, so that the Deer are caught and strangled as they move to and fro within the pound.



CARIBOU.—*Rangifer caribou.*

The Caribou (*Rangifer caribou*), or Woodland Caribou, is regarded as a peculiarly American species. It is large, measuring three feet six inches in height at the shoulders.

The relationship of this species with the European has been a matter of uncertainty, though it is now conceded that they are distinct.

Its present *habitat* is south of Hudson Bay to Lake Superior, and south-easterly to Maine and New Brunswick. It was probably common in most of the New England States.

The Barren Ground Caribou (*Rangifer groenlandicus*) is much smaller than the preceding; the horns, however, are much larger, and are very graceful in form. It inhabits the barren regions of Arctic America.

We now come to the Deer which inhabit the warm or temperate regions of the world, and which include the greater portion of the family. The first on the list is the Wapiti, or Carolina Stag.

This magnificent animal is one of the largest of the Deer tribe, the adult male measuring nearly five feet in height at the shoulders, and about seven feet nine inches from the nose to the root of the tail. It is a native of North America, where it is popularly known under the name of the Elk.

The Wapiti lives in herds of variable numbers, some herds containing only ten or twenty members, while others are found numbering three or four hundred. These herds are always under the command of one old and experienced buck, who exercises the strictest discipline over his subjects, and exacts implicit and instantaneous obedience. When he halts, the whole herd suddenly stop, and when he moves on the herd follow his example. There must be some method by which he communicates his orders to his followers, as the entire herd will wheel right or left, advance or retreat, with an almost military precision.

This position of dignity is not easily assumed, and is always won by dint of sheer strength and courage, the post being held against all competitors at the point of the horn. The combats that take place between the males are of a singularly fierce character, and often end in the death of the weaker competitor. An instance is known where a pair of these animals have perished in a manner similar to that which will be related of the carjacou, their horns having been inextricably locked together, causing the poor creatures to die a sad death of hunger and thirst. When attacked by the hunter, and wounded with a hurt that is not immediately mortal, the Wapiti will turn fiercely on his opponent, and fight with the reckless courage of despair.

Although the bucks display such courage in fighting for their spouses, they treat them very harshly when they have secured them, and always keep the poor creatures in constant fear. It is not until they have lost their horns that the does seem to lose the feelings of terror with which they regard their hard-hearted mates.

Even in captivity the male Wapiti retains its combative nature, as may be seen from the following anecdote, which is related in the work of Messrs. Audubon and Bachman.

"A gentleman in the interior of Pennsylvania, who kept a pair of Elks (Wapitis) in a large woodland pasture, was in the habit of taking pieces of bread or a few handfuls of corn with him when he walked in the inclosure, to feed these animals, calling them up for the amusement of his friends. Having occasion to pass through his park one day, and not having furnished himself with bread or corn for his pets, he was followed by the buck, who expected his usual gratification. The gentleman, irritated by the pertinacity with which he was accompanied, turned round, and picking up a small stick, hit the animal a smart blow; upon which, to his astonishment and alarm, the buck, lowering his head, rushed at him, and made a furious pass with his horns.

"Luckily he stumbled as he attempted to fly, and fell over the prostrate trunk of a tree near which lay another log, and being able to throw his body between the two trunks, the Elk was unable to injure him, although it butted at him repeatedly, and kept him prisoner for more than an hour. Not relishing this proceeding, the gentleman, as soon as he escaped, gave orders to have the unruly animal destroyed."

The Wapiti is a good swimmer, and even when very young will fearlessly breast the current of a wide and rapid river. Like many of the larger animals, it is fond of submerging itself under water in the warm weather, for the sake of cooling its heated body, and of keeping off the troublesome insects. It is also a good runner, and although burdened with its large and widely branched horns, can charge through the forest haunts with perfect ease. In performing this feat, it throws its head well back, so that the horns rest on the shoulders, and shoots through the tangled boughs like magic. Sometimes a Wapiti will make a slight miscalculation in its leap, for Mr. Palliser saw one strike a small tree with its forehead so fiercely, that the recoil of the elastic trunk threw the Wapiti fairly on its back upon the ice of a frozen stream which it had just crossed.

The food of the Wapiti consists of grass, wild pea-vine, various branches, and lichens, In winter it scrapes among the snow with its fore-feet, so as to lay bare the scanty vegetation below. When alarmed or excited, it gives vent to its feelings in a peculiar loud whistling sound, which on a clear quiet day may be heard at the distance of a mile. While uttering this sound, the animal raises its head in a very peculiar manner, and seems to eject the cry by a kind of spasmodic jerk. The flesh of the Wapiti is in great favor among hunters, while the marrow-bones are prized as great dainties. The skin is also valuable, being employed in the manufacture of moccasins, belts, thongs, and other articles where strength and flexibility are required. The teeth are employed by the Indians in decorating their dresses, and a robe thus adorned, which is in the possession of Mr. Audubon, was valued by its manufacturers as equivalent to thirty horses. The horns are also employed for various useful purposes. It is a remarkable fact, that in no two individuals are the horns precisely alike.

The genus *Cervus* is represented in South America by nine species, and by about the same number in North America.

The Wapiti (*Cervus canadensis*) is the largest of the the Deer, save the Moose. This animal has borne the designation Elk, and thereby is often mistaken for the Moose of Europe. American naturalists have preferred to use the term Wapiti, as applied by the aborigines.

As late as 1842 this noble beast was found in New York State. In the northwestern counties of Pennsylvania it was common until lately.

The Wapiti is more nearly allied to the Red Deer, or Stag of Europe. It is larger and more imposing than the latter. It was once very widely distributed; its range extending from ocean to ocean, and reaching as far north as latitude fifty-seven.

THE STAG, or RED DEER, is spread over many parts of Europe and Asia, and is indigenous to the British Islands, where it still lingers, though in vastly reduced numbers.

In the olden days of chivalry and Robin Hood, the Red Deer were plentiful in every forest; and especially in that sylvan chase which was made by the exercise of royal tyranny at the expense of such sorrow and suffering. Even in the New Forest itself the Red Deer is seldom seen, and those few survivors that still serve as relics of a bygone age, are scarcely to be reckoned as living in a wild state, and approach nearly to the semi-domesticated condition of the Fallow Deer. Many of these splendid animals are preserved in parks or paddocks, but they no more roam the wide forests in unquestioned freedom. In Scotland, however, the Red Deer are still to be found, as can be testified by many a keen hunter of the present day, who has had his strength, craft, and coolness thoroughly tested before he could lay low in the dust the magnificent animal, whose head with its forest of horns now graces his residence

Formerly the Stag was placed under the protection of the severest penalties, its slaughter being visited with capital punishment on the offender if he could be known and arrested. Indeed, a man who murdered his fellow might hope to escape retribution except by the avenging hand of some relation of the slain man, but if he were unfortunate or daring enough to dip his hands in the blood of a Stag, he could hope for no mercy if he were detected in the offence.

All the ancient works on hunting are filled with the praises of the Stag, which is belauded with a fluency of language and a fertility of expression that throw the modern sporting terminology completely into the shade. Every minute particular concerning the Stag itself, or the details of hunting, killing, cooking, and serving the animal is graced with its appropriate phrase, and if a gentleman should have perchance misplaced or omitted one of these ceremonious appellations, he would have been held in very low esteem by his compeers.

Although the Stag has been several times partially domesticated and trained to run in harness, it is a very capricious animal, and not a very safe servant. About the month of August the Stag always becomes very much excited, as that is the time when he seeks his mate, and during a space of three or four weeks the animal is testy and irritable in temper, and prone to attack with a kind of blind rage every other animal except a female of his own species. Comparatively tame Stags become dangerous at such a season, and have frequently assaulted those human beings to whom they were formerly attached. The sad death of a lady by an infuriated Stag is of recent occurrence, and may serve as a warning to persons who are ignorant of the strange fury that makes annual seizure of the animal's nature.

In the attack the Stag uses his fore-feet with as much force as the horns, and often with terrible effect, inasmuch as his opponent is seldom prepared for such a mode of action. The hard, pointed, sharp-edged hoofs of the creature become most formidable weapons in this mode of fighting, and are urged with such force and velocity that the coming blow can hardly be avoided. I once narrowly escaped an unexpected blow from a Stag's hoof. I had been feeding the animal with tufts of grass, and was stroking his neck and shoulders, when he suddenly reared up, and struck two blows with his fore-feet with such rapidity that although I was aware of his intention, and sprang backwards, the second stroke just reached one finger, and disabled it for some days.

The great speed of the Stag is proverbial, and needs no mention. It is an admirable swimmer, having been known to swim for a distance of six or seven miles, and in one instance a Stag landed in the night upon a beach which he could not have reached without having swum for a distance of ten miles. The gallant beast was discovered by some dogs as he landed, and being chased by them immediately after his fatiguing aquatic exploit, was overcome by exhaustion, and found dead on the following morning.

The color of the Stag varies slightly according to the time of year. In the summer the coat is a warm, reddish-brown, but in winter the ruddy hue becomes gray. The hind quarters are paler than the rest of the fur. The young Red Deer are born about April, and are remarkable for the variegated appearance of their fur, which is mottled with white upon the back and sides. As the little creatures increase in dimensions, the white marking gradually fades, and the fur assumes the uniform reddish-brown of the adult animal. For a short time after its birth the young Deer is helpless, and unable to escape even from a human pursuer, but it seems, nevertheless, to be possessed of much curious instinct, and to obey the mandates of its mother with instantaneous readiness. Mr. St. John mentions that he once saw a very young Red Deer, not more than an hour of age, standing by its mother and receiving her caresses. As soon as the watchful parent caught sight of the stranger, she raised her fore-foot and administered a gentle tap to her offspring, which immediately laid itself flat upon the ground, and crouched closely to the earth, as if endeavoring to delude the supposed enemy into an idea that it was nothing more than a block of stone.

THE FALLOW DEER may readily be distinguished from the stag, by the spotted coat, the smaller size, and the spreading, palmated horns.

It is never found in a truly wild state like the stag, but is largely kept in parks, and adds much to the beauty of the scene. There is hardly a more interesting sight than a herd of these graceful and active creatures, either lying calmly under the shadow of a broad clump of trees, or tripping along the sward under the guidance of their leaders, the old and sober proceeding at their peculiarly elastic trot, and the young fawn exerting all kinds of fantastic gambols by way of expressing the exuberance of youthful spirits. There is always one "master" Deer among them, who often couches alone in solitary state, apart from the rest of the herd, and only accompanied by a few chosen does whom he honors with his lordly preference.

In his absence, the herd is commanded and guided by the younger and less formidable bucks, but whenever he chooses to make his appearance among his subjects, his advent is always heralded by a general movement among the herd, the young bucks moving silently aside and making room for their monarch. Sometimes a more determined male will protest against such inglorious conduct, and will retain his post at the head of the herd. A threatening movement of the head is, however, generally sufficient to make him move slowly away from the place of honor, and in extreme cases, the offender against royal dignity is disdainfully swept aside by a blow from the horns of the master Deer. Not until he begins to fail in strength will the subordinate males venture to cross horns with one who has fought his way to the post which he holds, and whose prowess is too practically known to be questioned.

The color of the Fallow Deer is generally of a reddish-brown, spotted with white, and

FALLOW DEER.

with two or three white lines upon the body. There is, however, another variety which scarcely exhibits any of the white spots, and is of a deep blackish-brown.

The food of the Fallow Deer consists chiefly of grass, but it is very fond of bread, and will sometimes display a very curious appreciation of unexpected dainties. I have often seen them eat ham-sandwiches in spite of the mustard, and enjoy them so thoroughly that they pushed and scrambled with each other for the fragments as they fell on the ground. The animals nibble bread, and will raise themselves on their hind legs in order to reach it. It is curious to see how a single Deer will contrive to take into her mouth the entire side of a "half-quartern" loaf, and though it projected on each side of her jaws, would manage, by dint of patient nibbling, to swallow the whole crust without ever letting it drop out of her mouth.

It is from the Fallow Deer that the best venison is procured, that of the stag being comparatively hard and dry. The skin is well known as furnishing a valuable leather, and the horns are manufactured into knife-handles and other articles of common use. The shavings of the horns are employed for the purpose of making ammonia, which has therefore been long popularly known under the name of hartshorn. The height of the adult Fallow Deer is about three feet at the shoulders. It is a docile animal, and can be readily tamed. Indeed, it often needs no taming, but becomes quite familiar with strangers in a very short time, especially if they should happen to have any fruit, bread, or biscuit, and be willing to impart some of their provisions to their dappled friends.

THE SAMBUR, or SAMBOO (*Rusa aristótelis*), is an example of the Rusine Deer of Asia. It is a large and powerful animal, exceeding the red Deer in dimensions, and equaling that animal in activity and energy. The horns of the Samboo are set on a rather long footstalk, a snag projecting forwards just above the crown, and the tip simply forked. Its color is a sooty-brown, with a patch of tan over the eyes, the feet, and by the root of the tail. The male possesses a rather full and dark mane. It is generally a savage and morose creature, being especially vicious when it is decorated with its powerful horns. In its native land it is a water-loving animal, and is generally found in low-lying forest land.

ANOTHER member of the Rusine Deer is the well-known AXIS, CHITTRA, or SPOTTED HOG DEER, of India and Ceylon.

The horns are not at all unlike those of the samboo, being placed on long footstalks, and simply forked at their tips. The color of this pretty animal is rather various, but is generally a rich golden-brown, with a dark brown stripe along the back, accompanied by two series of white spots. The sides are covered with white spots, which at first sight appear to be scattered irregularly, but are seen on a careful inspection to be arranged in oblique curved lines. There is also a white streak across the haunches. There are, however, many varieties of the Axis Deer, which differ in size as well as in color. The height of the adult Axis is almost equal to that of the fallow Deer.

It does not appear to possess so much restless activity as is seen in many other Deer, and owing to its nocturnal habits, is but seldom seen by day. It frequents the thick grass jungles, preferring the low-lying lands, where a stream is within easy reach, and passing the greater part of the day asleep, in the deep shade of the heavy foliage. If disturbed it flies off with great speed for a short distance, but does not appear to be capable of maintaining a long chase.

OF the Capreoline Deer, the common ROEBUCK is a familiar example.

This animal is smaller than the fallow Deer, being only two feet and three or four inches in height at the shoulder, but although so small, can be really a formidable animal, on account of its rapid movements and great comparative strength. Speaking of this animal, Mr. St. John makes the following remarks. After stating that when captured young it can readily be tamed, he proceeds to say:

"A tame buck becomes a dangerous pet, for after attaining to his full strength, he is very apt to make use of it in attacking people whose appearance he does not like. They particularly single out women and children as their victims, and inflict severe and dangerous wounds with their sharp-pointed horns. One day, at a kind of public garden, I saw a beautiful but small Roebuck in an inclosure, fastened with a chain, which seemed strong enough and heavy enough to hold down an elephant. Pitying the poor animal, an exile from his native land, I asked what reason they could have for ill-using him, by putting such a weight of iron about his neck. The keeper of the place, however, informed me, that small as the Roebuck was, the chain was quite necessary, as he had attacked and killed a boy of twelve years old a few days before, stabbing the poor fellow in fifty places with his sharp-pointed horns. Of course I had no more to urge in his behalf."

AXIS DEER.—*Axis maculata.*

Yet, according to some practical writers on the subject, the Roebuck will not turn upon its pursuer, even when wounded and brought to bay. It is not found in large herds like the fallow Deer, but is strictly monogamous, the single pair living together, contented with each other's society. The horns of this animal have no basal snag, and rise straight from the forehead, throwing out one antler in front, and one or two behind, according to the age of the individual. From the base of the horn to the first antler the horn is thickly covered with wrinkles. It is a most active little Deer, always preferring the highest grounds, thence forming a contrast to the fallow Deer, which loves the plains.

The color of the Roebuck is very variable, but is generally as follows. The body is always of a brown tint as a ground hue, worked with either red or gray, or remaining simply brown. Round the root of the tail is a patch of pure white hair, and the abdomen and inside of the limbs are grayish white. The chin is also white, and there is a white spot on each side of the lips.

THE elegant and graceful CARJACOU, or VIRGINIAN DEER, is found in great numbers in North America, and is not only interesting to the naturalist on account of the beauty of its form, and the peculiarity of its habits, but is most valuable to the white and red hunters, as affording them an unfailing supply of food and clothing.

The Carjacou may be known by the peculiar shape of its horns, which, in the adult male, are of moderate size, bent boldly backwards, and then suddenly hooked forwards, the tips being nearly above the nose. There is a basal snag on the internal side, pointing backward, and several other snags on the posterior edge. The color of this animal is extremely variable, being of a light reddish-brown in spring, slaty-blue in autumn, and dull brown in winter. The abdomen, throat, chin, and inner faces of the limbs are white. The fawn is a remarkably pretty little creature, the ruddy-brown fur being profusely decked with white spots, arranged in irregular lines, and sometimes merging into continuous stripes. The height of the adult animal is five feet four inches, measured from nose to root of tail.

CARJACOU, OR VIRGINIAN DEER.—*Cervus virginianus.*

It is a timid animal, and so easily scared that the sight of a child fills it with alarm, and urges it to seek refuge by flight. Yet, with a singular inconsistency, it hangs about the skirts of civilization, and refuses to be driven from its favorite spots by the presence of man, or even by the sound of firearms. Like the ourebi, it has a strong attachment to certain localities, and if driven from its resting-place on one day, it will surely be found on the next day within a few yards of the same spot. Sometimes it chooses its lair in close proximity to some plantation, and, after feasting on the inclosed vegetables, leaps over the fence as soon as its hunger is satiated, and returns to the spot which it had previously occupied. The animal, however, does not often lie in precisely the same bed on successive nights, but always couches within the compass of a few yards.

That the Carjacou is a good leaper has been already seen, and the experience of many eyewitnesses shows that it displays equal prowess in the water. It is a good swimmer, and is in the habit of venturing to the water-side in the warm weather, and immersing itself in the stream, in order to rid itself of the persecuting ticks and mosquitoes. In the work of Messrs. Audubon and Bachman is a rather amusing anecdote.

"We recollect an occasion, when on sitting down to rest on the margin of the Santel River, we observed a pair of antlers on the surface of the water, near an old tree, not ten steps from us. The half-closed eye of the buck was upon us; we were without a gun, and he was therefore safe from any injury we could inflict upon him. Anxious to observe the cunning he would display, we turned our eyes another way and commenced a careless whistle, as if for our own amusement, walking gradually towards him in a circuitous route, until we arrived within a few feet of him. He had now sunk so deep in the water that an inch only of his nose and slight portions of his prongs were seen above the surface. At length we suddenly directed our eyes towards him and raised our hands, when he rushed to the shore, and dashed through the rattling cane-brake in rapid style."

The same author remarks, that the speed of the Carjacou, when swimming, is very considerable, the animal cleaving the water so rapidly that it can hardly be overtaken by a boat. As it swims, its whole body is submerged, the head only appearing above the surface. It is not only a swift but a very enduring swimmer, having been often seen crossing broad rivers, and swimming a distance of two miles. When hunted by hounds, the Virginian Deer has been known to baffle its pursuers by making for the sea-shore, taking boldly to the water, and swimming out to sea for a mile or more.

The male is a most pugnacious animal, and engages in deadly contests with those of his own sex, the prize being generally a herd of does. In these conflicts one of the combatants is not unfrequently killed on the spot, and there are many instances of the death of both parties in consequence of the horns interlocking within each other, and so binding the two opponents into a common fate. To find these locked horns is not a very uncommon occurrence, and in one instance three pair of horns were found thus entangled together, the skulls and skeletons lying as proofs of the deadly nature of the strife.

In those parts of the country where it is unable to visit the plantations, the Carjacou feeds on the young grasses of the plains, being fastidiously select in choosing the tenderest herbage. In winter it finds sustenance on various buds and berries, and in autumn it finds abundant banquets under the oaks, chestnuts, and beeches, revelling upon the fallen fruit in amicable fraternity with other quadrupeds and various birds. This variety of food does not render the animal fat at all times of the year, for excepting in the months of August, September, and October, the Carjacou is in very poor condition. It is then, however, very fat, and the venison is of remarkably fine quality. It is in October and November that the buck becomes so combative, and in a very few weeks he has lost all his sleek condition, shed his horns, and retired to the welcome shelter of the forest.

The sight of the Carjacou does not seem to be very keen, but its senses of scent and hearing are wonderfully acute. The slightest sound, even the snapping of a dry twig, will startle this wary animal, and the sense of smell is so acute that it is able to track its companions solely by means of the scent. It is a thirsty animal, requiring water daily, and generally visiting some stream or spring at nightfall. It is remarkably fond of salt, and resorts in great numbers to the saline springs, or "salt-licks," as they are popularly termed. The Deer do not drink the briny water, but prefer licking the stones at the edge where the salt has crystallized from the evaporation of the water.

When observed, the Carjacou leaps into the air like the bush-buck under similar circumstances, turning its head in every direction in order to detect the cause of its alarm, and then rushing away at full speed. Before it is accustomed to molestation, it starts from its lair long before the hunter can approach, but when it has frequently been harassed, it lies down, crouching to the ground, and endeavoring to escape the sight of its foe. Whenever it behaves in this manner it is easily outwitted, by riding or walking round the prostrate animal, and gradually lessening the circle, until it is within easy range.

When captured while young, the Carjacou is easily domesticated, and becomes even troublesome in its confident tameness. A pair of these animals that were kept by Mr. Audubon were most mischievous creatures. They would jump into his study window, and when the sashes were shut would leap through glass and woodwork like harlequin in a pantomime. They ate the covers of his books, nibbled his papers, and scattered them in sad confusion, gnawed the carriage-harness, cropped all the choice garden plants, and finally took to biting off the heads and feet of the ducklings and chickens.

The skin of the Carjacou is peculiarly valuable to the hunter, for when properly dressed and smoked, it becomes as pliable as a kid glove, and does not shrivel or harden when sub-

Animate Creation.

We have concluded to submit for public patronage a work with the above title, being a series of exquisite Engravings representing the ANIMAL WORLD, executed with great scientific accuracy, and accompanied by full Descriptive Text, written in popular terms, so as to delight and instruct the people. Anyone who has considered the subject must be at a loss to understand why an ILLUSTRATED NATURAL HISTORY, comprehensive and at the same time popular, has not before this been published in this country. Indeed any lover of animals who has visited the great museums and zoological gardens and has had access to books of engravings in the public libraries, could not fail to remark the wealth of material in existence devoted to this subject. Being confirmed in our conviction of the desirability of such a work, we laid under contribution the best existing authorities for the production of most perfect representations of all the more important living creatures, and among the artists whose delineations will delight the reader, we may mention Harrison Weir, Wolf, Coleman, Fr. Specht, and Mutzel. By far the majority of the engravings in these volumes are from drawings made from the *living* animals, many at the Zoological Society's Gardens in London, England.

We purpose that our patrons shall be aided and interested in their study by such an array of pictures as has never before embellished any Natural History. In numerous instances the engraving is printed in oil-colors, and this portion of the illustrations has been taken charge of by Messrs. L. Prang & Co., of Boston, who we believe rank foremost for high artistic results in this department of printing. These Oleographs were copied under the superintendence of Mr. Prang from the renowned "Tafeln" of "Brehm's Thierleben," so that they may be declared perfectly reliable.

We sought competent advice from various sources as to the most suitable text that should accompany this panorama of handsome Engravings. It was found impossible to embody all the present ideas of naturalists in a single work like this on account of the rapid advances and constant changes in their knowledge of, and habits of thought respecting, the Animal World. And it seemed to us correct that the true object of Zoology is not to arrange, to number, and to ticket animals in a formal inventory, but to inquire into their life-nature, and not simply to investigate the lifeless organism.

What do we know of "Man" from the dissecting-room? Is it not Man, the warrior, the statesman, the poet, etc., that we are interested in? With all veneration which attaches itself to these who are the accredited possessors of abstruse learning, their inordinate use of phraseology detracts too much, we fear, from the fascination that the study of the Animal World would otherwise yield, and as we are not content to have our work restricted to a favored few, we thought the task placed in our hands to be to keep the work free from a repellant vocabulary of conventional technicalities. Our endeavor has been to find an author whose work would be noted for its fund of anecdote and vitality rather than for merely anatomical and scientific presentation, and we arrived at the conclusion that we could not do better than avail ourselves of the Rev. J. G. Wood's comprehensive work—a work most popularly approved by speakers of the English language. It would be superfluous to say one word concerning the standard character of his book, from the pages of which old and young at the other side of the Atlantic have obtained so much instruction and rational amusement. Avoiding the lengthened dissertations and minute classifications of specialists, he presents to his readers in popular terms a complete treatise on the Animal Kingdom of all climes and countries. The one objection that could be urged against it was, that animal life in America might be treated more fully and American forms given more consideration. In order to obviate this drawback and to do full justice to the creatures of our own country, we secured the aid of Dr. J. B. HOLDER, of the American Museum of Natural History in New York, an undoubted American authority, who has adapted Wood's work to American wants and given prominence to American forms of Animal life.

The splendid work on Rodentia, by Allen, Coues, and others, will be fully consulted. The valuable work on North American Birds, by Baird, Brewer, and Ridgway, will be the guide in the treatment of birds. The late arrangement of the classification and nomenclature of North American Birds, by Mr. Ridgway, and the Committee on that subject of the Ornithologists' Union, will be utilized in full. The arrangement of Mammals will be after the latest classification by Professor Flower, of the Zoological Society of London. So that this will be the first popular Natural History worthy of the name that has made its appearance here, which gives due and full recognition to the animate world surrounding us.

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N. E.

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The late CHARLES DARWIN *writes:*—"The illustrations are the best I ever saw in any work. I [illegible] it superfluous to enter here into particulars, as I already, in the 'Descent of [illegible] how much I have profited by Mr. Brehm's book, [illegible] ly I esteem it."

[illegible] ing them. [illegible]."

W. B. CARPENTER, M.D., LL.D., *writes:*—"I can quite endorse the favorable opinions already given by dis[illegible] of the illustrations generally."

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jected to the action of water. Of this material are formed the greater part of the native Indian's apparel, and it is also employed for various articles of civilized raiment.

As the Carjacou feeds, it always shakes its tail before it lowers or raises its head. So by watching the movement of the tail, the hunter knows when he may move towards his intended prey, and when he must lie perfectly quiet. So truly indicative of the animal is this habit, that when an Indian wishes to signal to another that he sees a Carjacou, he moves his fore-finger up and down. This sign is invariably understood by all the tribes of North American Indians.

THE American Red Deer (*Cervus virginianus*) is the most familiar of the various species. It is absurd to perpetuate the specific name of this animal, as well as that of the preceding species; both are meaningless, as the animals are in no way represented by them. Yet, the law of priority in nomenclature keeps them in place. It would be much better could some authorized body of naturalists sit in judgment on these objectionable names, and substitute appropriate ones—*americana* would justly represent the great Wapiti; whereas, *canadensis* only refers to a small portion of its *habitat*. So with the Red Deer, Virginia is, certainly, not an especially favorite resort of the species.

The White-tailed Deer (*Cervus leucurus*) is the Long-tailed of Lewis and Clark, in earlier times. Its distinguishing characteristics are a long tail, narrow hoofs, and compact fur. The ears are gray, with a white spot at the base. The anal region and under surface of the tail are white. The tail is reddish above. The feet are long and slender. This species is very abundant on the Upper Platte and Upper Missouri, where it takes the place of the Virginia Deer.

THE Sonora Deer (*Cervus mexicanus*) resembles the Virginia Deer in general characters, but is smaller. The tail is shorter and whiter, and the ears are thinner.

THE Mule Deer (*Cervus macrotis*) is quite readily distinguished from other species by its long ears, and its larger size. It is next to the Wapiti in general dimensions. The horns are doubly two-pronged; the forks nearly equal. The ears are nearly as long as the tail, and give the creature quite an aspect of the mule. It inhabits the Upper Missouri region and on the banks of the Yellowstone.

THE Black-tailed Deer (*Cervus columbianus*) is about the size of the *virginianus*. There is a distinct dusky horseshoe mark on the forehead between the eyes. It is nearer the Mule Deer than any other species, having similiar antlers. It inhabits Oregon and California.

Many of the South American Deer are small, and very pleasing in proportions.

MUSK DEER.—*Moschus moschiferus.*

THE Moschine Deer are readily known by the absence of horns in both sexes, the extremely long canine teeth of the upper jaw in the males, and the powerfully odorous secretion in one of the species, from which they derive their popular as well as their scientific title. There are at least eight or nine species of these curious animals.

The most celebrated of these little Deer is the common MUSK DEER, which is a native of the northern parts of India, and is found spread throughout a very large range of country, always preferring the cold and elevated mountainous regions. The height of the adult Musk Deer is about two feet three inches at the shoulders; the color is light brown, marked with a shade of grayish-yellow. Inhabiting the rocky and mountainous locations of its native home, it is remarkably active and sure-footed, rivalling even the chamois or the goat in the agility with which it can ascend or descend the most fearful precipices. The great length of the false hoofs adds much to the security of the Musk Deer's footing upon the crags.

It is only in the male that the long tusks are seen, and that the perfume called musk is secreted. The tusks are sometimes as much as three inches in length, and therefore project considerably beyond the jaw. In shape they are compressed, pointed, and rather sharp-edged. The natives say that their principal use is in digging up the kastooree plant, a kind of subterranean bulb on which the Musk Deer feeds, and which imparts the peculiar perfume to the odorous secretion. The musk is produced in a glandular pouch placed in the abdomen, and when the animal is killed for the sake of this treasure, the musk bag is carefully removed, so as to defend its precious contents from exposure to the air. When securely taken from the animal, the musk is of so powerful an odor as to cause headache to those who inhale its overpowering fragrance. The affluence of perfume that resides in the musk is almost incredible, for a small piece of this wonderful secretion may remain in a room for many years, and at the end of that time will give forth an odor which is apparently not the least diminished by time.

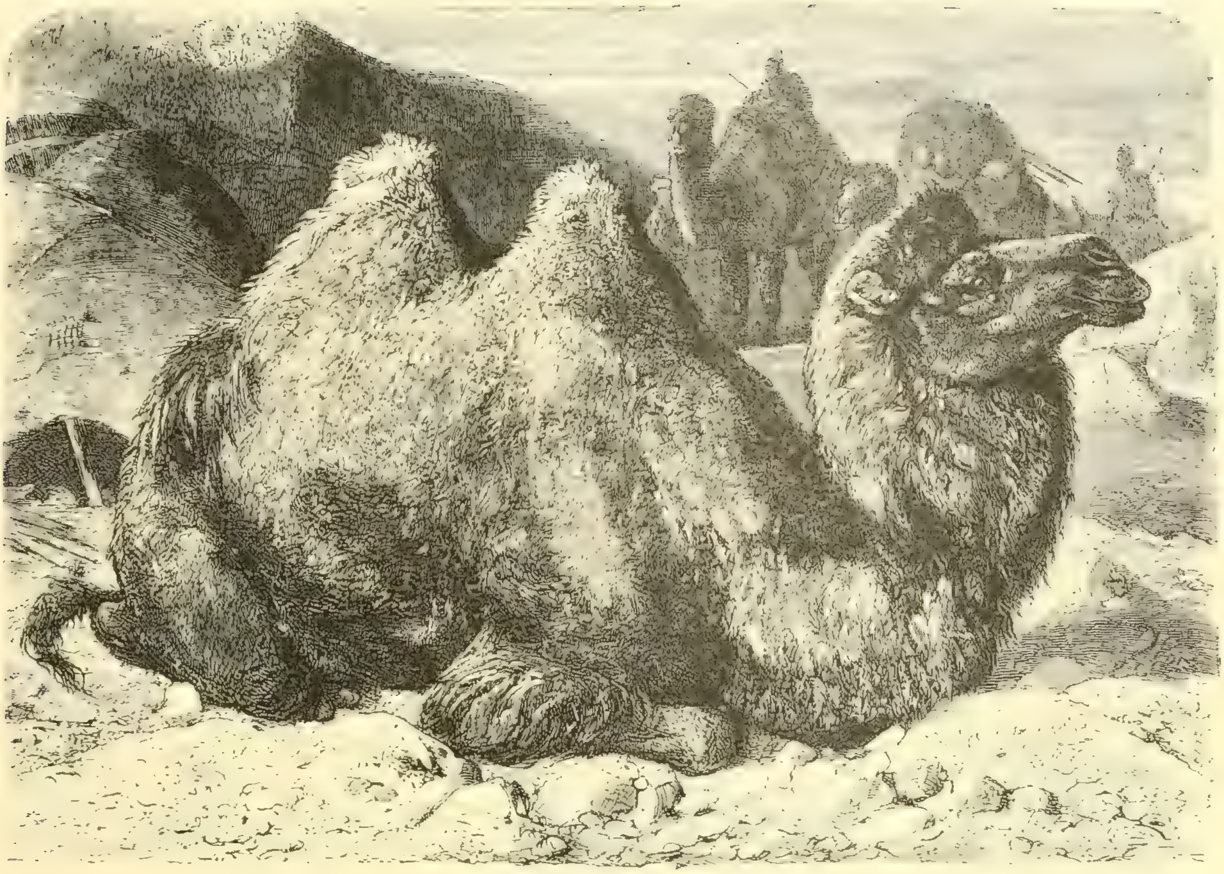
On account of the value of the musk, the animal which furnishes the precious substance is subjected to great persecution on the part of the hunters, who annually destroy great numbers of these active little animals. The native hunters await the season of migration, when the Deer are forced to pass into more clement latitudes in search of subsistence, and beset their path with various traps, besides seizing every opportunity of destroying them by missiles. Although so good a leaper, and so well adapted for traversing the rocky crags of its native hills, the Musk Deer is not a very good climber, and descends slopes with great difficulty.

KANCHIL, OR PIGMY MUSK DEER.—*Tragulus pygmæus.*

Another member of the Moschine group is the Kanchil, or Pigmy Musk (*Trágulus pygmæus*), a Deer which is found in the Asiatic islands, and which is as celebrated for its cunning as is the fox among ourselves.

This animal is not nearly so large as the musk Deer, and although somewhat similar in color, may be distinguished by a broad black stripe which runs along the back of the neck, and forms a wide band across the chest. Instead of living in the cold and lofty mountain ranges which are inhabited by the musk Deer, the Kanchil prefers the thickly wooded districts of the Javanese forests. Like many other animals, the Kanchil is given to "possuming," or feigning death when it is taken in a noose or trap, and as soon as the successful hunter releases the clever actor from the retaining cord, it leaps upon its feet and darts away before he has recovered from his surprise.

The Napu, or Java Musk, inhabits Java and Sumatra, and without possessing the intellect of the Kanchil, is a very pleasing animal to the sight, and as it is readily domesticated, is well adapted to European menageries.



BACTRIAN CAMEL.—*Camelus bactrianus.*

THE CAMEL.

FROM the earliest times that are recorded in history, the CAMEL is mentioned as one of the animals which are totally subject to the sway of man, and which in eastern countries contribute so much to the wealth and influence of their owners.

There are two species of Camel acknowledged by zoologists, namely, the common Camel of Arabia, which has but one hump, and the Mecheri, or Bactrian Camel, which possesses two of these curious appendages. Of these two animals, the former is by far the more valuable, as it is superior to its two-humped relative in almost every respect. Admirably fitted, as are all animals, for the task which they are intended to perform, the Camel presents such wonderful adaptations of form to duty, that the most superficial observer cannot but be struck with the exquisite manner in which the creature has been endowed with the various qualities of mind and body which are needful under the peculiar circumstances amid which it dwells.

As the animal is intended to traverse the parched sand plains, and to pass several consecutive days without the possibility of obtaining liquid nourishment, there is an internal structure which permits the animal to store up a considerable amount of water for future use. For this purpose, the honeycomb cells of the "reticulum" are largely developed, and are enabled to receive and retain the water which is received into the stomach after the natural thirst of the animal has been supplied. After a Camel has been accustomed to journeying across the hot and arid sand wastes, it learns wisdom by experience, and contrives to lay by a much greater supply of water than would be accumulated by a young and untried animal. It is supposed that the Camel is, in some way, able to dilate the honeycomb cells, and to force them to receive a large quantity of the priceless liquid.

A large and experienced Camel will receive five or six quarts of water into its stomach, and is enabled to exist for as many days without needing to drink. Aided by this internal supply of water, the Camel can satiate its hunger by browsing on the hard and withered thorns that are found scattered thinly through the deserts, and suffers no injury to its palate from their iron-like spears, that would direfully wound the mouth of any less sensitive creature. The Camel has even been known to eat pieces of dry wood, and to derive apparent satisfaction from its strange meal.

The feet of the Camel are well adapted for walking upon the loose, dry sand, than which substance is no more uncertain footing. The toes are very broad, and are furnished with soft, wide cushions, that present a considerable surface to the loose soil, and enable the animal to maintain a firm hold upon the shifting sands. As the Camel is constantly forced to kneel in order to be loaded or relieved of its burden, it is furnished upon the knees and breast with thick callous pads, which support its weight without injuring the skin. Thus fitted by nature for its strange life, the Camel faces the desert sands with boldness, and traverses the arid regions with an ease and quiet celerity that has gained for the creature the title of Ship of the Desert.

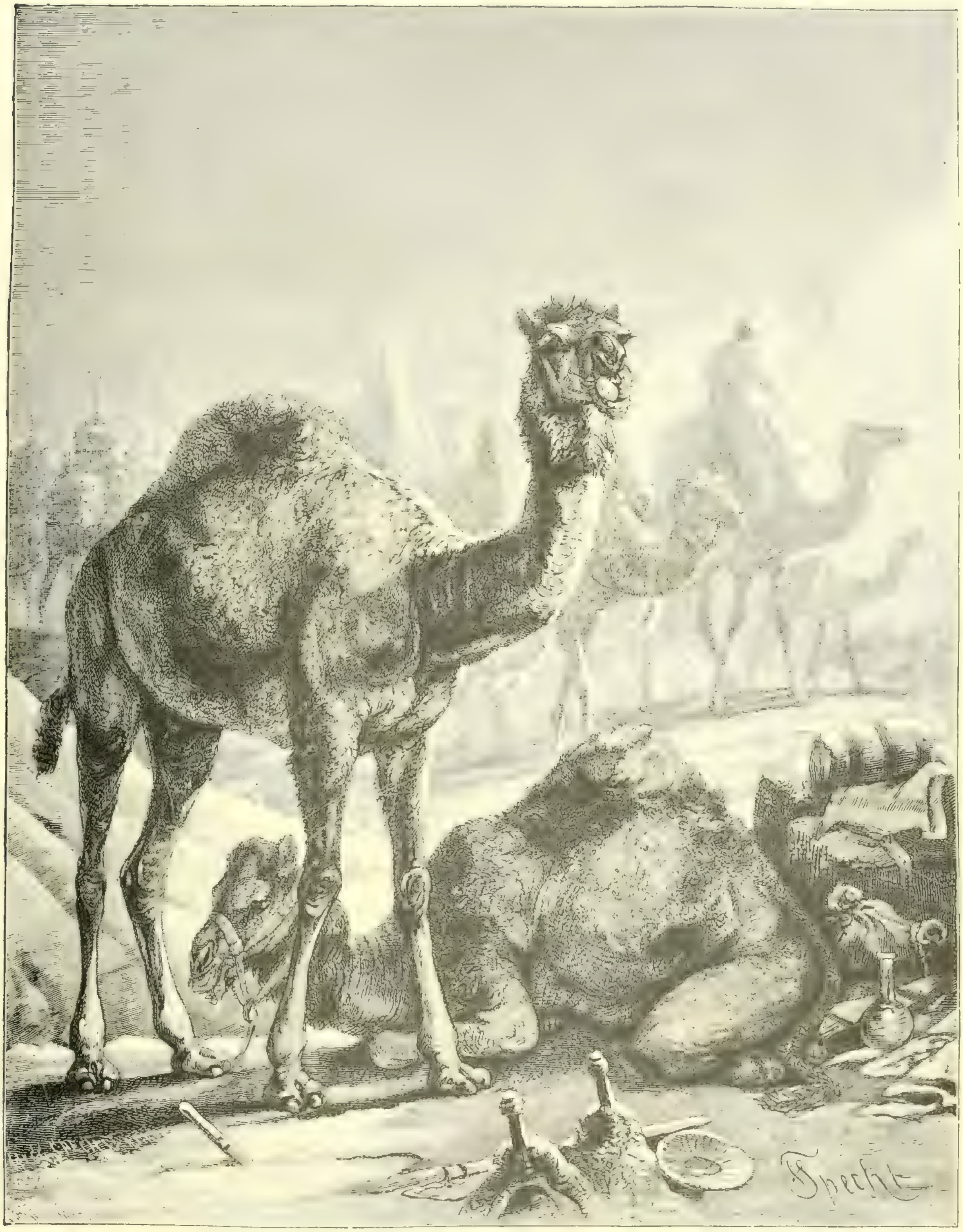
The Camel is invariably employed as an animal of carriage, when in its native land, and is able to support a load of five or six hundred pounds' weight without being over-loaded. The Arab will not willingly injure his Camel by placing too heavy a burden upon its back, but in India, and some other countries where the Camel has been naturalized and domesticated, its treatment is barbarous in the extreme. Hundreds of valuable animals are annually sacrificed on account of the covetousness of their owners, who know that they will receive payment for every Camel that falls upon the journey, and are consequently indifferent to the suffering and condition of those animals which they have nominally taken under their care.

The pace of the Camel is not nearly so rapid as is generally supposed, and even the speed of the Heirie, or swift Camel, has been greatly exaggerated. "In crossing the Nubian desert," says Captain Peel, "I paid constant attention to the march of the Camels, hoping it might be of some service hereafter in determining our position. The number of strides in a minute with the same foot varied very little, only from thirty-seven to thirty-nine, and thirty-eight was the average; but the length of the stride was more uncertain, varying from six feet six inches to seven feet six inches. As we were always urging the Camels, who seemed, like ourselves, to know the necessity of pushing on across that fearful tract, I took seven feet as the average. These figures give a speed of 2.62 geographical miles per hour, or exactly three English miles, which may be considered as the highest speed that Camels, lightly loaded, can keep up on a journey. In general, it will not be more than two and a half English miles. My dromedary was one of the tallest, and the seat of the saddle was six feet six inches above the ground."

The speed of the Heirie is seldom more than eight or ten miles per hour, but the endurance of the animal is so wonderful, that it is able to keep up this pace for twenty hours without stopping. To back a Heirie at full speed is a terrible task, as the peculiar jolting trot at which the animal proceeds is so rough and irregular that it seems to dislocate every bone, and to shake the digestive organs almost out of their places. It is needful for any one who wishes to make a long journey on one of these animals to swathe himself tightly in bandages, in order to save himself from the ill effects of long continued jolting.

The gentle disposition and sweet temper of the Camel is quite as imaginary as its speed, for the creature is truly an ill-conditioned and morose beast, ever apt to bite, and so combative as to engage in terrible conflicts with its own species as soon as it is relieved of its load. Taking advantage of this disposition, the native chiefs will often amuse themselves by combats between fighting Camels, which are trained for the purpose, like the fighting tigers and buffaloes of India.

The true disposition of the Camel is told in a very spirited manner by the author of "Life among the Pandies."



CAMEL.

"Invaluable he is, I admit; likewise hardy, capable of carrying enormous loads for great distances under a frightful sun, and generally admirably suited for the purpose to which he is put, namely, that of a baggage animal. But to say that a Camel is patient, to affirm that this great, grumbling, groaning, brown brute is either docile, meek, or sweet-tempered, is stating what is simply not the case; and I have no hesitation in saying, that never do I remember to have seen a Camel in a good humor, or otherwise than in open or moody hostility with the world at large; at least, if outward appearances are to be credited.

"Watch him when he is being loaded; see his keeper struggling frantically with him, only succeeding in making him kneel down for the purpose by sheer force, and when down, only keeping him there by tying neck and fore-legs together tightly with a piece of string; hear him grumbling in deep, bubbling tones, with mouth savagely opened, and I think that then, at least, you will admit he is by no means in as amiable a frame of mind as one could wish. Observe him now that the process of loading is completed, and the string which held him in subjection loosened; up he rises, a great brown mountain, still groaning, still bubbling, and away he goes, madly dashing to and fro, and shaking off tables, portmanteaus, beds, furniture, and baggage in a scattered shower around him; and I think that even his stanchest admirers will allow, that neither at this moment is he in what one would call a pleasant humor.

"Mr. Camel having, after some battling, been overcome and compelled to carry the load to which he so objected, but not until he has damaged it considerably, arrives when the march is over at the camping ground. It is then necessary to make him kneel down to have that load removed, grumbling as much as ever, in opposition as usual, beaten physically, but with soul unsubdued, and internally in a state of rebellion and mutiny, a sort of volcano ready at any moment to burst forth."

The "hump" of the Camel is a very curious part of its structure, and is of great importance in the eyes of the Arabs, who judge of the condition of their beasts by the size, shape, and firmness of the hump. They say, and truly, that the Camel feeds upon his hump, for in proportion as the animal traverses the sandy wastes of its desert lands, and suffers from privation and fatigue, the hump diminishes. At the end of a long and painful journey, the hump will often nearly vanish, and it cannot be restored to its pristine form until the animal has undergone a long course of good feeding. When an Arab is about to set forth on a desert journey, he pays great attention to the humps of his Camels, and watches them with jealous care.

Independently of its value as a beast of burden, the Camel is most precious to its owners, as it supplies them with food and clothing. The milk mixed with meal is a favorite dish among the children of the desert, and is sometimes purposely kept until it is sour, in which state it is very grateful to the Arab palate, but especially nauseous to that of a European. The Arabs think that any man is sadly devoid of taste who prefers the sweet new milk to that which has been mellowed by time. A kind of very rancid butter is churned from the cream by a remarkably simple process, consisting of pouring the cream into a goat-skin sack, and shaking it constantly until the butter is formed. The flesh of the Camel is seldom eaten, probably because the animal is too valuable to be killed merely for the sake of being eaten. Sometimes, however, in a season of great festivity, a rich Arab will slay one of his Camels, and calling all his friends and relations to the banquet, they hold high festival upon the unaccustomed dainty. The long hair of the Camel is spun into a coarse thread, and is employed in the manufacture of broadcloths and similar articles. At certain times of the year, the Camel sheds its hair, in order to replace its old coat by a new one, and the Arabs avail themselves of the looseness with which the hair is at these times adherent to the skin, to pluck it away without injuring the animal.

In extreme cases, when the water has failed for many days, and the desert fountains are dried up, the Camel dies for the purpose of prolonging the life of its master, and yields up the store of water which is laid up in the cells of the stomach. The water thus obtained is of a light green color, and very unpleasant to the palate; but when a man is dying of thirst he is not very particular as to the quality of the liquid which may save his life. Unpleasant though it be, this water is hardly more unpalatable than that which is carried in leathern bags on the Camel's back, and which is not only heated by the rays of the fierce sun, but is strongly impregnated with a leathery flavor, and smells as if it were taken out of a tan-pit. The water which is taken from the Camel's stomach is even cooler than that which has been carried on its back, as the natural heat of the animal is not comparable to that which is produced by the continual rays of the burning desert sun.

The height of an ordinary Camel at the shoulder is about six or seven feet, and its color is a light brown, of various depths in different individuals, some specimens being nearly black, and others almost white. The dromedary is the lighter breed of Camel, and is chiefly used for riding, while the ordinary Camel is employed as a beast of burden. Between the two animals there is about the same difference as between a dray-horse and a hunter, the Heirie being analogous to the race-horse.

VICUGNA.—*Auchenia vicunna.*

THE BACTRIAN CAMEL is readily to be distinguished from the ordinary Camel by the double hump which it bears on its back, and which is precisely analogous in its structure and office to that of the Arabian Camel.

The general formation of this animal; its lofty neck, raising its head high above the solar radiations from the heated ground; its valve-like nostrils, that close involuntarily if a grain of drifting sand should invade their precincts; its wide cushion-like feet, and its powers of abstinence, prove that, like its Arabian relative, it is intended for the purpose of traversing vast deserts without needing refreshment on the way. This species is spread through central Asia, Thibet, and China, and is domesticated through a large portion of the world. It is not so enduring an animal as the Arabian species, requiring a fresh supply of liquid every three days; while the Arabian camel can exist without water for five or even six days. It is employed by the Persians in a rather curious military capacity; its saddle being furnished with one or two swivel guns, which are managed by the rider. The corps is called the Camel Artillery, and is of considerable value in the peculiar mode of fighting which is prevalent in the East.

The height of the Bactrian Camel is rather more than that of the Arabian species, and its color is generally brown, which sometimes deepens into sooty black, and sometimes fades into a dirty white.

The true camels are exclusively confined to the Old World, but find representatives in the New World in four acknowledged species of the genus Llama.

These animals are comparatively small in their dimensions, and possess no hump, so that they may easily be distinguished from the camels. Their hair is very woolly, and their countenance has a very sheep-like expression, so that a full-haired Llama instantly reminds the spectator of a long-legged, long-necked sheep. The feet of the Llamas are very different from those of the camels, as their haunts are always found to be upon rocky ground, and their feet must of necessity be accommodated to the ground on which they are accustomed to tread. The toes of the Llama are completely divided, and are each furnished with a rough cushion beneath, and a strong, claw-like hoof above, so that the member may take a firm hold of rocky and uneven ground.

YAMMA, OR LLAMA.—*Auchenia lama.*

Four species of Llamas are now acknowledged; namely, the Vicugna, the Guanaco, the Yamma, and the Alpaca, each of which will be briefly described.

The Vicugna is found in the most elevated localities of Batavia and Northern Chili, and is a very wild and untamable animal, having resisted all the attempts of the patient natives to reduce it to a state of domestication. It is extremely active and sure-footed in its mountain home, and being equally timid and wary, is seldom captured in a living state. It lives in herds near the region of perpetual snow, and in its habits bears some resemblance to the chamois. The short, soft, silken fur of this animal is very valuable, and causes the death of thousands of Vicugnas, which are slain by various methods merely for the sake of their coats. The color of the Vicugna is a nearly uniform brown, tinged with yellow on the back, and fading into gray on the abdomen. Its height at the shoulder is about two feet six inches.

The Guanaco is spread over a very wide range of country, ranging over the whole of the temperate regions of Patagonia. The color of this species is a reddish-brown, the ears and hind legs gray. The neck is long in comparison to the size of the body, and the height at the shoulder is about three feet six inches.

The Guanaco lives in herds varying in number from ten to thirty or forty, but is sometimes seen in flocks of much greater numbers, resembling sheep, not only in their gregarious habits, but in the implicit obedience with which they rely upon their leader. Should they be deprived of his guardianship they become so bewildered that they run aimlessly from spot to spot, and can be easily destroyed by experienced hunters. It is a very wary and timid animal; but like many creatures of similar disposition, is possessed with so strong a feeling of curiosity that it can be attracted towards the hunter if he lies down on the ground and kicks his feet in the air. Even the reports of his rifle do not frighten the animals, who, says Darwin, consider them as part of the performance. Still, it is a quick-sighted and wary animal, and if it perceives a human being approaching its domicile, it sets up a shrill neighing scream, which is often the first intimation of its presence. The whole herd then set off into a rapid canter along the hill-side, and gain some elevated spot where they can feel themselves safe.

ALPACA, OR PACO.—*Auchenia paco.*

The Guanaco, in common with the other species, is rather short-tempered, and has a very unpleasant habit of displaying its anger by discharging a shower of half-digested food and saliva over the offender. Formerly, this salival discharge was thought to be acrid, and capable of raising blisters upon the human skin. This, however, is fortunately not the case, although the assault is eminently disagreeable, on account of the ill scent of the ejected liquid. In its wild state the Guanaco seems to have little or no idea of resistance, being easily held by a single dog until the hunter can come up and make sure of his prize. But in domesticated life, it seems to imbibe a spirit of combativeness, for it will kick with both hind legs, and deliver severe blows with the knees of those limbs. Among themselves, however, the males fight desperately, the cause of combat being generally some favored and coveted female.

The Guanaco is wonderfully sure-footed upon rocky ground, and is also a good swimmer, taking voluntarily to the water, and swimming from one island to another. When near the sea, it will drink the salt water, and has often been observed in the act of drinking the briny waters of certain salt springs.

The Yamma, or Llama, is of a brown, or variegated color, and its legs are long and slender. In former days, this animal was the only beast of burden which was possessed by the natives, and it was largely used by the Spaniards (who described it as a sheep) for the same purpose. It is able to carry a weight of one hundred pounds, and to traverse about fourteen or fifteen miles per diem. As a beast of burden, it is now being rapidly supplanted by the ass, while the European sheep is gradually taking its place as a wool-bearer. The flesh of the Llama is dark and coarse, and is accordingly held in bad repute.

The Alpaca, or Paco, is, together with the last animal, supposed by several zoologists to be only a domesticated variety of the Guanaco. Its color is generally black, but is often variegated with brown and white. The wool of this species is long, soft, silky, and extremely valuable in the commercial world. A herd of Llamas has been imported into Australia, and seems to have succeeded remarkably well, the yield of wool having been quite as rich as was hoped by the enterprising importer. It is a handsome and a gentle animal, and is only found in a domesticated state.

TARPAN.—*Equus tarpan.*

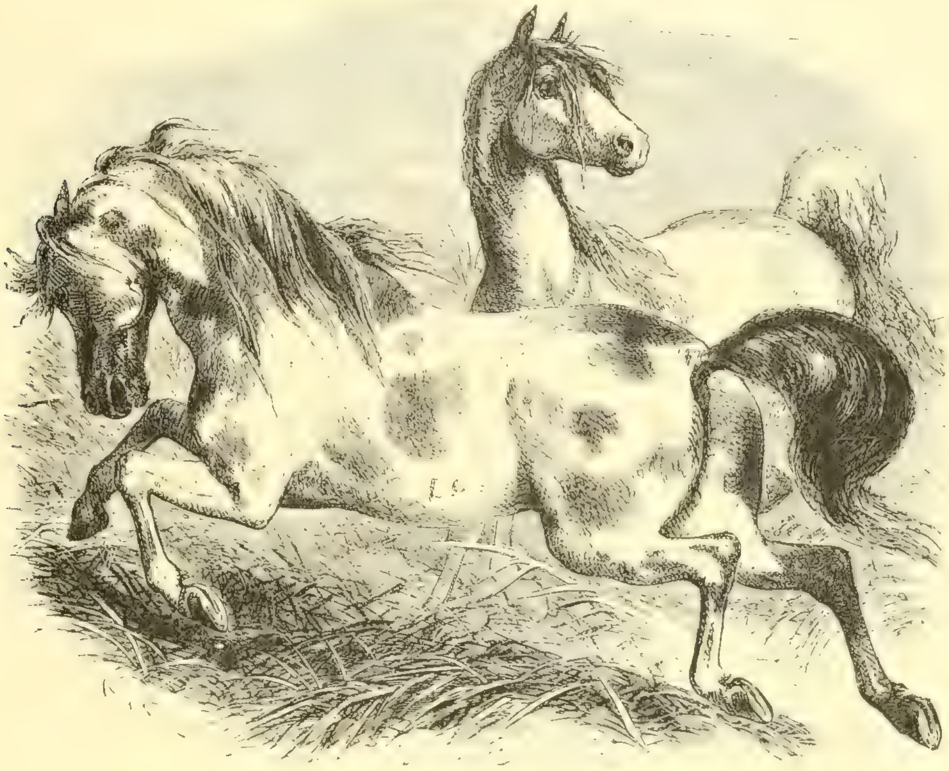
HORSES.

THE HORSE has, from time immemorial, been made the companion and servant of man, and its original progenitors are unknown. It is supposed, however, that the Horse must have derived its origin from Central Asia, and from thence have spread to almost every portion of the globe.

There are several countries, such as Tartary and Northern America, where the Horse runs wild, and has almost entirely reverted to its primeval state, thus affording an idea of the manners and customs of the Horse before it was subjected to the dominion of man. In Tartary, the Wild Horses are found in herds, consisting of many thousands in number, and are actuated by a wonderful spirit of discipline, each herd acting under the commands of a single leader, and executing his orders with military precision. The Tartars recruit their studs from these herds, capturing the best and strongest animals with the aid of a falcon, which is trained to settle on the Horse's head, and flutter its wings about his face so as to blind and detain him until the hunter comes up to secure his prize. The horses thus taken are coupled with the tame animals, and in a very short time learn to perform their share of the work, and to obey the orders of their master as implicitly as they once obeyed those of their quadrupedal leader.

Each herd is headed by an old experienced Horse, who holds his position by right of conquest, and loses his chieftainship if vanquished by any opponent. The young males are always excluded from these herds, and are forced to live solitary lives until they can attract some of the opposite sex, and set up an establishment on their own account. The color of the Wild Horse of Tartary is red, with a black stripe along the back.

Not only do the Tartars ride their horses, but they drink the milk and eat the flesh, so that a Horse-hunt is often conducted merely as a food-procuring expedition. From the milk the Tartars manufacture a peculiar sub-acid liquid, which they term "koumiss," and is made by permitting it to become sour, and then stirring the curd and milk violently with a large stick until it is forced into a homogeneous mass. From the same substance the Tartars make a fermented liquid. These Horses are very strong and hardy, and the breed is preserved in good condition by the custom which prevails among the Tartars of killing and eating the defective or weak foals, and preserving the strong and healthy for use. Being brought up with the family, the Tartar Horse is very gentle and familiar with its owners. When they are only a few months of age they are ridden by the children, but never backed by a man until they are five or six years old. They are then, however, severely treated, being forced to travel for several consecutive days, and to endure great privations of hunger and thirst.



MUSTANG.

ANOTHER well-known example of the Wild Horse is the MUSTANG of the American prairies.

This animal is congregated into vast herds, which are always under the guardianship of a single leader, who is able, in some wonderful manner, to convey his orders to all his subjects simultaneously. Although surrounded by various enemies, such as the puma, the wolf, and the jaguar, they care little for these ravenous and powerful carnivora, trusting in their united strength to save them from harm. There is no animal that will dare to face a troop of Wild Horses, which often entice the domesticated animals into their ranks, and carry them exultingly into the free plains.

The Mustang is always a strong and a useful animal, and is much sought after as a saddle-horse. To capture these wild creatures is a very difficult matter, and is generally managed by the help of the lasso, although the rifle is sometimes called into requisition in difficult cases. This latter plan, technically called "creasing," is never employed but by very accurate marksmen, as the difference of half an inch in the line of fire is sufficient either to miss the animal or to kill it on the spot. In "creasing" a Horse, the hunter aims so as to graze the skull just behind the ear, the sudden blow stunning the horse for a few seconds, during which time the hunter pounces on the bewildered animal, and secures it before it has fairly recovered its senses.

The lasso is, however, generally employed for this purpose, and as it can be thrown with precision to a distance of thirty feet, is a terrible weapon in practised hands. This formidable instrument is very simple in construction, being a carefully plaited rope of green hide, one end being furnished with an iron ring, and the other extremity fastened to the saddle. When not in use, it is hung in coils upon a projection of the saddle, but when the hunter has his game in view, he throws the coils over his left arm, makes a slip-noose by means of the iron ring, and then grasping the ring and cord firmly in his left hand, so as to prevent the noose from slipping, he grasps the centre of the noose and the main cord in his right hand, and is then ready for action. Swinging the large noose, four or five feet in diameter, around his head, the weight of the iron ring giving a powerful impetus, the hunter is able to hurl the leathern cord to its full length, and with deadly aim. As the noose flies circling through the air it gradually contracts in diameter, so that the hunter is forced to accommodate the size of the loop to the distance of the object aimed at.

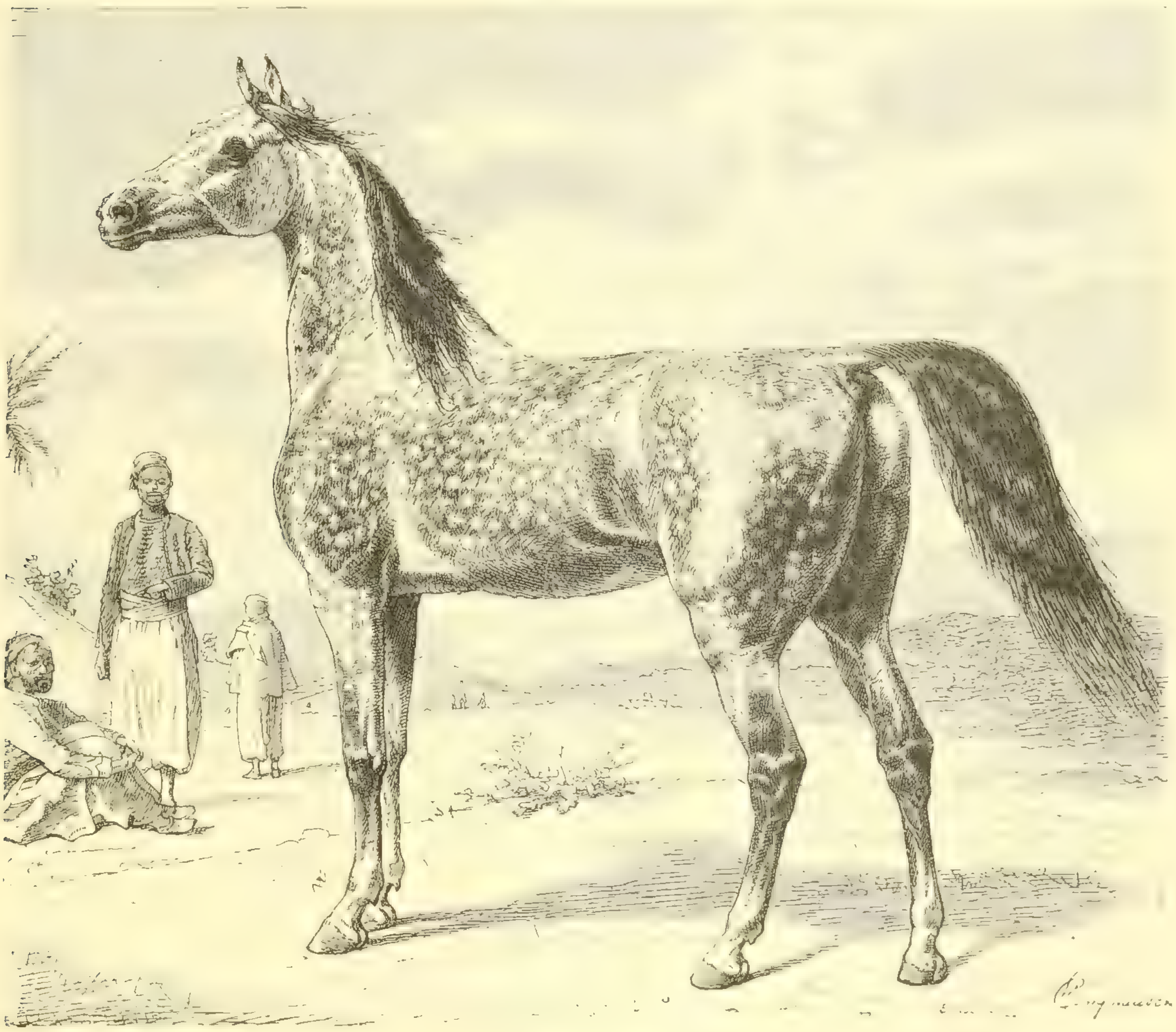
When fully caught, the Mustang is savage and furious at his discomfiture, and would speedily escape from his bondage but for the clever and simple method of subjection which is employed. The lasso being flung round its neck, the Horse nearly strangles itself by its plungings and struggles, and is soon reduced to stand still and gasp for breath. The hunter now dismounts from his Horse, and keeping his hands on the lasso, advances cautiously towards the captured animal, hauling the rope tight whenever it tries to escape. In a short time he works his way towards the creature's head, and seizing its muzzle in his hand, blows strongly into its nostrils. Overcome by some strange influence, the Horse immediately becomes quiet, and in a few hours can scarcely be distinguished from a regularly trained animal.

This mode of reducing the Horse to subjection is employed by the Comanche and neighboring Indians, but the Gauchos, or inhabitants of the Pampas, manage in a different and far more cruel manner, the idea of humanity never entering the head of either Indian or white man. As soon as a Wild Horse is captured, its legs are suddenly pulled aside, and the poor animal falls prostrate on the ground. A Gaucho then seats himself on his head, while others gird a saddle tightly on his back, and force a bit into his mouth. The rider next stands astride the prostrate quadruped, which is then released from the weight upon its head. Up leaps the Horse, striving in vain to escape, for the Gaucho seats himself in the saddle as the animal rises, and is never to be shaken off as long as the Horse disobeys his will. However restive the poor creature may be, it soon exhausts itself by unavailing efforts, and becomes passively submissive. Sometimes a stubborn and determined animal refuses to move, and stands rooted to the spot on which it had fallen. The cruel spurs of the Gaucho, however, soon set it going, and in a very short time it is thoroughly subdued.

THE elegant, swift, and withal powerful Horses of which England is so proud, from which our own best breeds are descended, and which are employed in the chase or the course, owe their best qualities to the judicious admixture of the Arabian blood. The ARAB HORSE has long been celebrated for its swift limbs, exquisite form, and affectionate disposition ; the latter quality resulting, however, chiefly from the manner in which it is tamed.

There are several breeds of Arab Horses, only one of which is of very great value. This variety, termed the Kochlani, is so highly prized, that a mare of the pure breed can hardly be procured at any cost, and even the male animal is not easy of attainment. The pedigree of these Horses is carefully preserved, and written in most florid terms upon parchment. In some cases, the genealogy is said to extend for nearly two thousand years. The body of the Arab Horse is very light, its neck long and arched, its eye full and soft, and its limbs delicate and slender. The temper of the animal is remarkably sweet, for as it has been born and bred among the family of its owner, it avoids injuring even the little children that roll about among its legs, as carefully as if they were its own offspring. So attached to its owner is this beautiful Horse, that if he should be thrown from its back, the animal will stand quietly by its prostrate master, and wait until he gains strength to remount.

The training of the Kochlani is not so severe as is generally imagined, for the presence of water and abundant pasturage is absolutely necessary in order to rear the animal in a proper manner. Not until the strength and muscles of the animal are developed, is a trial permitted, and then it is truly a terrible one. When the mare—for the male animal is never ridden by the Arabs—has attained her full development, she is mounted for the first time, and ridden at full speed for fifty or sixty miles without respite. Hot and fainting, she is then forced into deep water, which compels her to swim, and if she does not feed freely immediately after this terrific trial, she is rejected as unworthy of being reckoned among the true Kochlani.



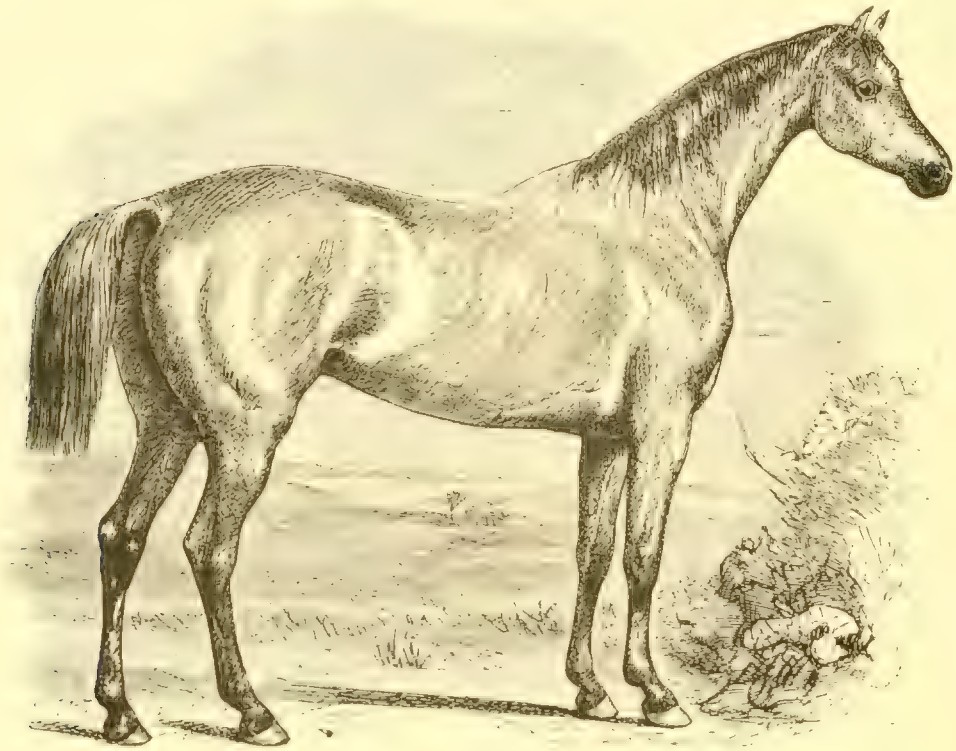
ARAB HORSE.

For the animals which will stand this terrible test the Arab has almost an idolatrous regard, and will oftentimes spare an enemy merely on account of his steed.

The Race Horse and Trotting Horse are, perhaps, the most admirable examples of the perfection to which a domesticated animal can be brought by careful breeding and training.

Whatever may have been its original source, the Racer has been greatly improved by the mixture of Arab blood, through the means of the Godolphin and Derby Arabians. The celebrated Horse Eclipse was a descendant, on the mother's side, of the Godolphin Arabian, that wonderful animal which was rescued from drawing a cart in Paris, and which was afterwards destined to play so important a part in regenerating the breed of English racers. He was also descended, on his father's side, from the Darley Arabian. It is a remarkable fact, that both parents of this extraordinary animal were unappreciated by their owners; Marsk, his father, having been purchased for a mere trifle, and then permitted to run nearly wild in the New Forest. Spiletta, his mother, only ran one race, in which she was beaten, and Squirt, the father of Marsk, was actually saved by the intercession of a groom as he was being led to the slaughter-house.

Eclipse was never beaten, and his racing career extended only through seventeen months, and in that short period of time he won more than $125,000. At his last race he was obliged to walk over the course, as no one dared enter a Horse against him. Ten years after that event, his owner, Mr. O'Kelly, was requested to sell him, and demanded the sum of $125,000, an annuity of $2,500 a year, together with six of his offspring yearly. When he died, in 1789, he was twenty-five years old, and had realized for his owner a princely fortune. His shape was very remarkable, the hinder quarters being considerably higher than the shoulders and his breathing was so thick that it could be heard at a considerable distance. He was originally purchased for about $400.



HUNTER

MANY thoroughbred Horses which are not suitable for the purposes of the turf are admirably adapted for the chase, and are trained for that purpose. The body of the Hunter should not be so long as that of the racer, and requires greater compactness, in order that he may not fatigue himself by taking too long a stride over ploughed land. A comparatively large foot is required, in order to save it from being destroyed by the rapid alternation of soft and hard ground which the animal is obliged to traverse, and which would batter a small contracted foot to such an extent as to render the Horse useless. The low shoulders of Eclipse would be very injurious in a Hunter, on account of the numerous and trying leaps which it is often called upon to perform.

The best bred Horses are generally the most affectionate and docile, although their spirit is very high, and their temper hot and quick. There are few animals which are more affectionate than a Horse, which seems to feel a necessity for attachment, and if his sympathies be not roused by human means, he will make friends with the nearest living being. Cats are great favorites with Horses, and even the famous Chillaby, called, from his ferocity, the Mad

Arabian, had his little friend in the shape of a lamb, which would take any liberties with him, and was accustomed to butt at the flies as they came too near his strange ally. The Godolphin Arabian was also strongly attached to a cat, which usually sat on his back, or nestled in the manger. When he died, the cat pined away and soon followed her loved friend.

These examples are sufficient to show that the ferocity of these animals was caused by the neglect or ignorance of their human associates, who either did not know how to arouse the affectionate feelings of the animal, or brutally despised and crushed them. The Horse is a much more intellectual animal than is generally supposed, as will be acknowledged by any one who has possessed a favorite Horse, and treated it with uniform kindness.

There is no need for whip or spur when the rider and steed understand each other, and the bridle is reduced almost to a mere form, as the touch of a finger, or the tone of a voice, are sufficient to direct the animal. We are all familiar with the elephantine dray-horses that march so majestically along with their load of casks, and which instantaneously obey the singular sounds which continually issue from the throats of their conductors, and back, stop, advance or turn to the right or left, without requiring the touch of a rein or the blow of a whip. The infliction of pain is a clumsy and barbarous manner of guiding a Horse, and we shall never reap the full value of the animal until we have learned to respect its feelings, and to shun the infliction of torture as a brutal, a cowardly, and an unnecessary act. To maltreat a child is always held to be a cowardly and unmanly act, and it is equally cowardly and unworthy of the human character to maltreat a poor animal which has no possibilty of revenge, no hope of redress, and no words to make its wrongs known. Pain is pain, whether inflicted on man or beast, and we are equally responsible in either case.

As an unprejudiced observer, with no purpose to serve, and without bias in either direction, I cannot here refrain from observing, that Mr. Rarey's method of bringing the Horse under subjection is a considerable step in the right direction, and a very great improvement on the cruel and savage method which is so often employed by coarse and ignorant men, and truly called "breaking." Having repeatedly witnessed the successful operations of that gentleman, in subduing Horses that had previously defied all efforts, I cannot be persuaded that it is a cruel process. The method by which it is achieved is now sufficiently familiar, and I will only observe, that the idea is a true and philosophical one. The Horse is mostly fierce because it is nervous, and bites and kicks, not because it is enraged, but because it is alarmed. Restore confidence, and the creature becomes quiet, without any desire to use its hoofs and teeth in an aggressive manner. It is clearly impossible to do so as long as the animal is at liberty to annihilate its teacher, and the strap is only used until the Horse is convinced that the presence of a human form, or the touch of a human hand, has nothing of the terrible in it. Confidence soon takes the place of fear, and the animal seems to receive its teacher at once into its good graces, following him like a dog, and rubbing its nose against his shoulder.

The ingenuity of the Horse is very considerable, and the creature will voluntarily perform acts that display a considerable amount of intellect. From a number of anecdotes relating to the intellectual powers of the Horse, I select the following, some of them entirely original, and others very little known.

An orchard had been repeatedly stripped of its best and ripest fruit, and the marauders had laid their plans so cunningly that the strictest vigilance could not detect them. At last the depredators were discovered to be a mare and her colt which were turned out to graze among the trees. The mare was seen to go up to one of the apple-trees and to throw herself against the trunk so violently that a shower of ripe apples came tumbling down. She and her offspring then ate the fallen apples, and the same process was repeated at another tree. Another mare had discovered the secret of the water-butt, and whenever she was thirsty, was accustomed to go to the butt, turn the tap with her teeth, drink until her thirst was satisfied, and then to close the tap again. I have heard of two animals which performed this feat, but one of them was not clever enough to turn the tap back again, and used to let all the water run to waste.

A careless groom was ordered to prepare a mash for one of the Horses placed under his care, and after making a thin, unsatisfactory mixture, he hastily threw a quantity of chaff on the surface and gave it to the Horse. The animal tried to push away the chaff and get his nose into the mash, but was unable to do so, and when he tried to draw the liquid into his mouth, the chaff flew into his throat and nearly choked him. Being baffled, he paused awhile, and then pulled a lock of hay from the rack. Pushing the hay through the chaff, he contrived to suck the liquid mash through the insterstices until the hay was saturated with moisture. He then ate the piece of hay, pulled another lock from the rack, and repeated the process until he had finished his mash.

LIKE the Race Horse and the Hunter, the HACKNEY or ROAD HORSE is obtained by judicious breeding, and is said by Mr. Youatt to be "more difficult to find than even the hunter or the courser. There are several faults that may be overlooked in the hunter, but which the Road Horse must not have. The former may start, may be awkward in his walk or even his trot, he may have thrushes or corns; but if he can go a good slapping pace, and has wind and bottom, we can put up with him and prize him. But the Hackney, if he is worth having, must have good fore legs and good hinder ones, too; he must be sound on his feet, even-tempered, no starter, quiet in whatever situation he may be placed, not heavy in hand, and never disposed to fall on his knees. A Hackney is far more valuable for the pleasantness of his paces and his safety, good temper and endurance, than for his speed. We rarely want to go more than eight or ten miles an hour, and on a journey not more than six or seven. The fast Horses, and especially the fast trotters, are not even in their paces, and although they may perform very extraordinary feats, are disabled and worthless when the slower Horse is in his prime."

The same author, to whose valuable work on the Horse the reader is referred as a treasury of valuable information, proceeds to observe that pure blood is disadvantageous to a Hackney, as it gives small hoofs, slender legs, and a long stride, each of which qualities would be hurtful on the hard stony road. There should, however, be a spice of high breeding in the animal, the amount to be regulated by the country in which it lives and the work which it has to perform.

When properly managed and kindly treated, the Hackney is a most intelligent animal, displaying a singularly excellent memory. This extraordinary memory of the Horse has often proved serviceable to its owner, and in many instances has been made the means of saving his life. An ordinary Hackney had been ridden to a spot far from home, very difficult to find, and into which neither he nor his rider had previously been. Two years afterwards, the same journey was repeated, but at a distance of three or four miles from his destination the night closed in and the rain poured in torrents. Having entirely lost his way, the rider in despair flung the reins on his Horse's neck, and left him to his own desires. The intelligent animal proved himself equal to the trust which was reposed in him, and in half-an-hour drew up at the house which his master was visiting.

The power of the well-bred Hackney may be imagined from the following feat, recorded in the above-mentioned work:

"A mare was matched to trot one hundred miles in ten hours and a half. She was one of those rare animals that could do almost anything as a hack, a hunter, or in harness. On one occasion, after having, in following the hounds and travelling to and from course, gone through at least sixty miles of country, she fairly ran away with her rider over several ploughed fields. She accomplished the match in ten hours and fourteen minutes, or deducting thirteen minutes for stoppages, in ten hours and a minute's actual work, and thus gained the victory. She was a little tired, and being turned into a horse-box, lost no time in taking her rest. On the following day she was as full of life and spirit as ever. The owner had given positive orders to the driver to stop at once on her showing decided symptoms of distress, as he valued her more than anything he could gain by her enduring actual suffering."

OUR country has long been celebrated for the excellence of its Trotting Horses, and we have succeeded in obtaining a breed of Horses that are intended exclusively for that pace. In America the trot is the only pace that is valued, and the energies of the animal are all directed to that single point. A good trotter is possessed of endurance as well as speed, for one of these animals trotted one hundred miles in ten hours and seven minutes, inclusive of thirty-seven minutes which were occupied in refreshment and stoppages, so that the actual time occupied was only nine hours and a half.

In the present times, when railways have taken the place of the old mail coaches, the regular Coach Horse is little needed, and has been metamorphosed into the handsome but less-enduring Carriage Horse.

A valuable Carriage Horse has a large admixture of good blood in him, and as he is required more for the sake of appearance than for steady hard work, he is required to possess a high, strong action and proud bearing, well-arched neck, and a light springy step. His speed is very considerable, and he can do a great amount of work, but he is not fitted for dragging heavy loads like his predecessors, nor can he endure a continuance of work, for several days in succession. The splendid action of the Carriage Horse, although it is very showy, and adds much to the magnificence of his appearance, is injurious to the welfare of his feet and legs, which are sadly damaged by being battered against the hard stones of the street pavements.

The name of Cleveland Horse is given to this animal because it derives its origin from the Cleveland Bay, a variety of the Horse that is largely bred at Cleveland, in England, and which, when crossed with more or less thorough-bred animals, produces the best Carriage Horses in the world. Very great care is bestowed on this important subject, and in the finest animals there is so much of the pure blood that, in the words of Mr. Youatt, "the Coach Horse is nothing more than a tall, strong, over-sized hunter." According to the same experienced author, the principal points in the Carriage Horse are substance well placed, a deep and well-proportioned body, bone under the knee, and sound, open, tough feet.

The true, pure-blooded, Suffolk Punch is now nearly extinct, having been so frequently crossed with other breeds that its individuality has been almost entirely lost.

The old Suffolk Punch, so called from its round, punchy form, is a wonderful animal for pulling, being built as if expressly for the purpose of dragging great weights with unflinching perseverance. A team of these Horses needs no incitement by the whip, but as soon as they hear the command of their driver, they fling their whole weight into the collar, and almost throw themselves on their knees in their anxiety to fulfil their task. They seem to be perfectly aware of their powers, and to be jealously tenacious of their supremacy, for even if they find after one or two efforts that the load resists their best endeavors, they do not refuse to exert themselves any further, as is often the case with draught Horses, but will persevere in pulling until they drop with fatigue. The low heavy shoulder, and strong quarters of the Suffolk Punch are of infinite service in drawing the plough or the cart, and its hardy frame and determined disposition enable it to support a hard day's labor without being overcome.

These valuable characteristics have been employed in improving the breed of carriage Horses, for it is a wonderful fact, and one which cannot be too carefully considered, that mental traits are more enduring than bodily form, and that a crossed breed derives its true value, not so much from the outward form which is obtained by the cross, but from the mental characteristics that are transmitted through a series of generations. The reader may remember that in the case of the greyhound a bull-dog cross was introduced in order to impart courage and determination to a breed that had sacrificed everything to speed, and that although the bull-dog form was totally eradicated in a few generations, the bull-dog spirit remained.

Thus with the Suffolk Punch. Some of the best carriage Horses have been obtained by crossing the Suffolk Punch with a thorough-bred hunter, so as to unite the excellences of the two animals, giving speed and rapid force to the draught Horse, and the power of pulling to the hunter.

An elephant among Horses, the mixed Flemish and Black Draught Horse is familiar as drawing the heavy drays on which beer is conveyed from the breweries to the purchaser.

This enormous animal is really needed for his peculiar work, although a natural emulation that exists between the different firms leads them to rival each other in the size and magnificence of their dray Horses, as well as in the excellence of their beer. It is a general idea that the dray Horses derive their huge bulk from being fed on grains and permitted to drink beer, and that the draymen owe their large proportions and rubicund aspect to similar privileges. Such is, however, not the case, as the Horses are bred especially for the purpose, and the men are chosen with an eye to their jovial aspect. It would never answer for a brewer

SHETLAND PONY.

to keep a poor, wizened, starveling drayman, for the public would immediately lay the fault on the beer, and transfer their custom elsewhere.

The dray Horse is a very slow animal, and cannot be permanently quickened in his pace, even if the load be comparatively light. Its breast is very broad, and its shoulders thick and upright, the body large and round, the legs short, and the feet extremely large. The ordinary pace of the heavy Draught Horse is under three miles an hour, but by a judicious admixture of the Flemish breed the pace is nearly doubled, the endurance increased, and the dimensions very slightly diminished. The great size of the dray Horse is required, not for the absolute amount of pulling which it performs, but for the need of a large and heavy animal in the shafts to withstand the extreme jolting and battering that takes place as the springless drays are dragged over the rough stones of the metropolis. And as a team of two or three small leaders and one huge wheeler would look absurd, it is needful to have all the Horses of uniform dimensions and appearance.

The genuine dray Horse is a noble beast, and it is very pleasant to see the kindly feelings which exist between them and their drivers. The long whip is carried upon the drayman's shoulders more as a badge of office than as an instrument of torture, and if used at all, it is gently laid upon the Horse's back, accompanied with some endearing language, which is very intelligible to the horse, but not to be comprehended by ordinary human intellects.

One of the best Horses for ordinary heavy work is the Clydesdale Cart Horse, an animal which has derived its name from the locality where it was first bred. It is larger than the Suffolk Punch, and owes its origin to the Lanark Horse crossed with the large Flemish breed. In temper it is docile, and it is possessed of enormous strength and great endurance. The pure breed is large and heavy, and is notable for a very long stride. When judiciously crossed with other breeds it produces offspring which are extensively employed in the carriage and for the saddle.

Several breeds of partially wild Horses are still found in the British islands, the best known of which is the Shetland Pony.

This odd, quaint, spirited little animal is an inhabitant of the islands at the northern extremity of Scotland, where it runs wild, and may be owned by any one who can catch and hold it. Considering its diminutive proportions, which only average seven or eight hands in height, the Sheltie is wonderfully strong, and can trot away quite easily with a tolerably heavy man on its back. One of these little creatures carried a man of twelve stone weight for a distance of forty miles in a single day. The head of this little animal is small, the neck short and well arched, and covered with an abundance of heavy mane, that falls over the face and irresistibly reminds the spectator of a Skye-terrier. It is an admirable draught Horse when harnessed to a carriage of proportionate size; and a pair of these spirited little creatures, when attached to a lady's low carriage, have a remarkably piquant and pretty appearance.

Man has so long held the Domestic Ass under his control, that its original progenitors have entirely disappeared from the face of the earth.

There are, as it is well known, abundant examples of wild Asses found in various lands, but it seems that these animals are either the descendants of domesticated Asses which have escaped from captivity, or mules between the wild and domestic animals. In size and general appearance the Ass varies greatly, according to the country which it inhabits, and the treatment to which it is subjected. The Spanish kind, for example, is double the size of the ordinary English Ass, and even the latter animal is extremely variable in stature and general dimensions. As a rule, the Ass is large and sleek-haired in warmer countries, and small and woolly-haired in the colder parts of the globe.

Strong, sure-footed, hardy, and easily maintained, the Ass is of infinite use to the poorer classes of the community, who need the services of a beast of burden, and cannot afford to purchase or keep so expensive an animal as a horse. In the hands of unthinking and uneducated people, the poor creature generally leads a very hard life, and is subjected to much and undeserved ill-treatment; not so much from deliberate cruelty as from want of thought. We often see the poor animal laden with a burden that is evidently beyond its powers, and continually urged forward by blows. Not long ago, I saw a poor donkey harnessed to a low cart in which were seated three full-grown women, one of whom was continually belaboring the animal with a thick stick. Presently they stopped, took up a fourth passenger, and again moved on, in spite of all remonstrances on behalf of the unfortunate creature that was forced to drag so heavy a weight.

ASS.—*Equus asinus.*

This cruel treatment is as impolitic as it is inhuman; for there are few animals which will better repay kindness than the Ass, or will develop better qualities.

Some years ago a very excellent movement was started by Captain Scott, for the purpose of ameliorating the condition of certain unfortunate donkeys which were employed in the conveyance of coal, and were in a most pitiable condition.

Several persons had attempted to remonstrate with the owners of the poor animals, and had only been insulted, without achieving any successful result. Captain S., however, struck out another line of conduct, and instead of abusing or persecuting those who treated their animals badly, he offered prizes to those who could produce the best and healthiest donkey. Several persons joined him in this most laudable undertaking, and they held quarterly meetings, at which the prizes were bestowed. A medal was also given to each successful competitor, and the association pledged themselves to employ no donkey-driver who could not produce a medal. The natural consequences followed. The public soon took up the idea, the medal-holders carried off all the trade, and the cruel and neglectful drivers were either forced to conform to the regulations of the society, or to betake themselves and their beasts elsewhere.

It is a very great mistake to employ the name of Ass or donkey as a metaphor for stupidity, for the Ass is truly one of the cleverest of our domesticated animals, and will lose no opportunity of displaying his capability whenever his intelligence is allowed to expand by being freed from the crushing toil and constant pain that are too often the concomitants of a donkey's life. Every one who has petted a favorite donkey will remember many traits of its mental capacities; for as in the case of the domestic fool of the olden days, there is far more knavery than folly about the creature.

One of these animals was lately detected in a most ingenious theft. A number of rabbits were kept in a little outhouse, and inhabited a set of hutches fastened to the wall. One day it was found that nearly all the store of oats had suddenly vanished from the outhouse without any visible reason. Next morning, however, the donkey who lived in an adjoining meadow was seen to open the gate which led into his field, and cautiously shut it after him. This conduct afforded a clue to the disappearance of the oats, and upon a careful search being made, his footmarks were traced along the path to the rabbit-house, and even on the ground among the hutches. It was very clear that the ingenious animal must have unlatched his own gate, unfastened the loop of the rabbit-house, finished all the oats, and have returned as he went, re-fastening all the doors behind him. In leaving the rabbit-house he must have backed out, as the place was not wide enough to permit him to turn.

He was very familiar with the children, and would permit three of them to ride on his back together. After a while the boys went to school, and some ponies were procured for the other members of the family, so that Sancho had a long holiday. When the boys returned from school, they mounted Sancho as usual for the purpose of having their ride. The cunning animal allowed them to seat themselves, and then coolly shook them off again. This process he repeated until they gave up the hopeless attempt, and Sancho gained his purpose.

That a donkey has more than once succeeded in beating off the attacks of a leopard by vigorous and rapid kicks of his hind-feet is well known, and an incident occurred some years ago which shows that the animal is as valiant in opposing dogs as in fighting leopards. A surly, ill-intentioned man, who possessed an equally surly bull-dog, set his animal at an unoffending donkey. The bull-dog, nothing loth, made at his intended victim and sprang at him. The Ass, however, cleverly avoided the dog's onset, seized him in its teeth, carried him to a river near which the scene occurred, plunged him under water, and there lying down upon him, prevented him from regaining the surface, and fairly drowned his opponent.

Another Ass displayed a singular discrimination of palate, being celebrated for his love of good ale. At one road-side inn the landlady had been very kind in supplying the donkey with a glass of his loved beverage, and the natural consequence was, that the animal could never be induced to pass within a moderate distance of the spot without going for his beer. Neither entreaties nor force sufficed to turn his head in another direction, and his master was in such cases obliged to make the best of the matter, and permit the animal to partake of his desired refreshment. He had a curious knack of taking a tumbler of beer between his lips, and drinking the contents without spilling a drop of the liquid or breaking the glass. So curious a sight as a donkey drinking beer was certain to attract many observers, who testified their admiration by treating the animal to more beer. His head, however, was fortunately a strong one, for only once in his life was he ever seen intoxicated, and on that solitary occasion his demeanor was wonderfully decorous.

A petted donkey belonging to one of my friends was permitted to walk at large in the garden, on condition that he restrained himself from leaving the regular paths. Once or twice he had been seduced by the charms of some plant to walk upon the flower-beds, and had been accordingly drubbed by the gardener, who detected the robber by the marks of his footsteps, which were deeply imprinted in the soft mould. After a while the animal seemed to have reflected upon the circumstance which led to the discovery of his offence, and the next time that he walked upon the flower-beds, he scraped the earth over his foot-marks, and endeavored to obliterate the traces of his disobedience. As, however, his hoofs were not very delicate tools, and his method of levelling anything but gentle, the marks were more conspicuous than before.

In the East, the Ass is used more extensively than elsewhere, and is generally employed for carrying burdens or for the saddle, the horse being used more for ostentation or for warfare than for the mere conveyance of human beings from one spot to another. The following account of donkey-riding in Cairo, by Bayard Taylor, gives a most vivid and animated description of the manner in which the Ass is employed in the East.

"To see Cairo thoroughly, one must first accustom himself to the ways of those long-eared cabs, without the use of which I would advise no one to trust himself in the bazaars. Donkey-riding is universal, and no one thinks of going beyond the Frank quarters on foot. If he does, he must submit to be followed by not less than six donkeys, with their drivers. A friend of mine who was attended by such a cavalcade for two hours, was obliged to yield at last, and made no second attempt. When we first appeared in the gateway of an hotel, equipped for an excursion, the rush of men and animals was so great, that we were forced to retreat until our servant and the porter whipped us a path through the yelling and braying mob. After one or two trials, I found an intelligent Arab boy named Kish, who for five piastres a day furnished strong and ambitious donkeys, which he kept ready at the door from morning till night. The other drivers respected Kish's privilege, and thenceforth I had no trouble.

"The donkeys are so small that my feet nearly touched the ground, but there is no end to their strength and endurance. Their gait, whether in pace or in gallop, is so easy and light that fatigue is impossible. The drivers take great pride in having high-cushioned, red saddles, and in hanging bits of jingling brass to the bridles. They keep their donkeys close shorn, and frequently beautify them by painting them various colors. The first animal I rode had legs barred like a zebra's, and my friend's rejoiced in purple flanks and a yellow belly. The drivers run behind them with a short stick, punching them from time to time, or giving them a sharp pinch on the rump. Very few of them own their donkeys, and I understood their pertinacity when I learned that they frequently received a beating on returning home empty-handed.

"The passage of the bazaars seems at first quite as hazardous on donkey-back as on foot; but it is the difference between knocking somebody down and being knocked down yourself, and one certainly prefers the former alternative. There is no use in attempting to guide the donkey, for he won't be guided. The driver shouts behind, and you are dashed at full speed into a confusion of other donkeys, camels, horses, carts, water-carriers and footmen. In vain you cry out '*Bess*' (enough), *Piacco*, and other desperate adjurations: the driver's only reply is, 'Let the bridle hang loose!' You dodge your head under a camel load of planks; your leg brushes the wheel of a dust-cart; you strike a fat Turk plump in the back; you miraculously escape upsetting a fruit stand; you scatter a company of spectral, white-masked women, and at last reach some more quiet street, with the sensations of a man who has stormed a battery.

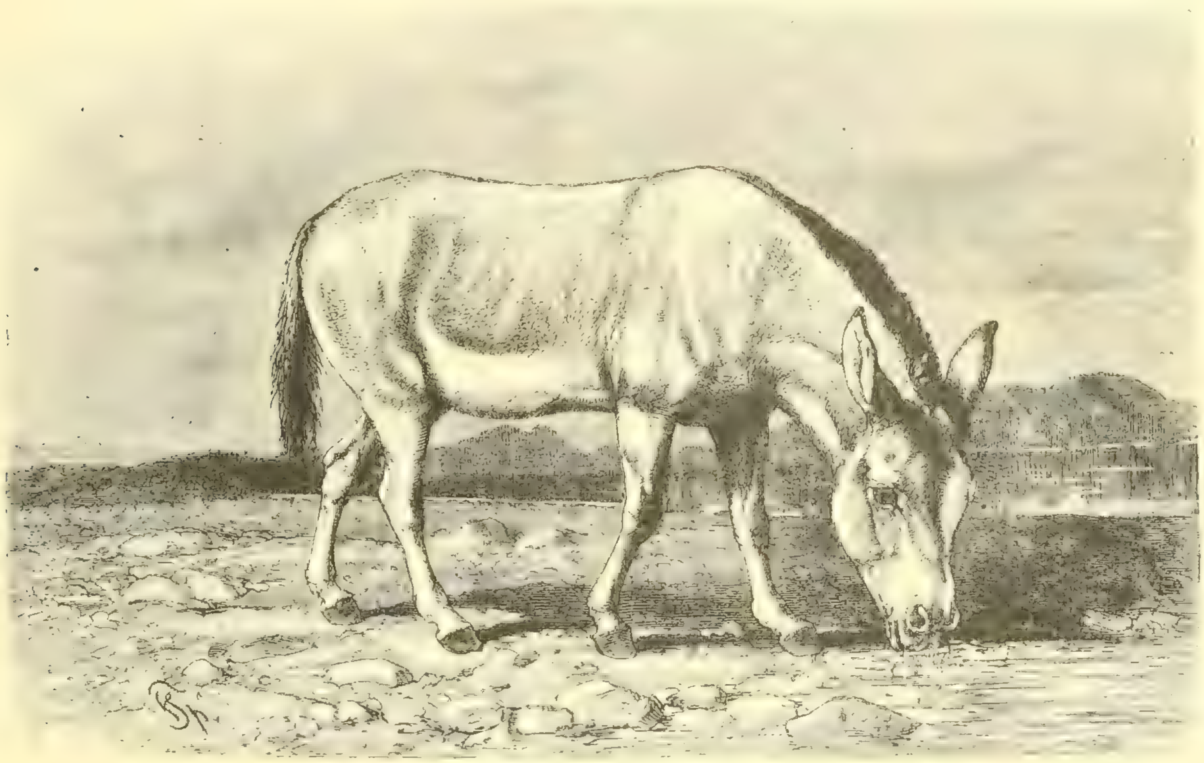
"At first this sort of riding made me very nervous, but presently I let the donkey go his own way, and took a curious interest in seeing how near a chance I ran of striking or being struck. Sometimes there seemed no hope of avoiding a violent collision, but by a series of the most remarkable dodges, he generally carried you through in safety. The cries of the driver running behind, gave me no little amusement. 'The howadji comes! Take care on the right hand! Take care on the left hand! O man, take care! O maiden, take care! O boy, get out of the way! The howadji comes!' Kish had strong lungs, and his donkey would let nothing pass him, and so wherever we went we contributed our full share to the universal noise and confusion."

The color of the Ass is a uniform gray, a dark streak passing along the spine, and another stripe being drawn transversely across the shoulders. In the quagga and zebra these stripes are much more extended.

The cross-breed between the horse and the ass, which is commonly known by the name of the MULE, is a very valuable animal for certain purposes, possessing the strength and power of the horse, with the hardiness and sure foot of the ass. The largest and most useful Mules are those which are produced by a male ass and a mare, the large Spanish Ass being the best for this purpose. In Spain and in many eastern countries the Mule is an animal of some importance, the parents being selected as carefully as those of the horse itself. The chief drawback in the rearing of this animal is that it is unproductive, and is incapable of continuing its species, so that there can be no definite breed of Mules, as of horses and asses.

THE Wild Asses are all celebrated for their extreme fleetness and sureness of foot, and among them the DZIGGETAI, KHUR, or KOULAN deserves especial mention.

This animal is so wonderfully swift that it cannot be overtaken even by a fleet Arabian horse, and if it can get upon hilly or rocky ground, it bids defiance to all wingless enemies. Not even the greyhound can follow it with any hope of success when it once leaves level ground. This great speed renders it a favorite object of chase with the natives of the countries which it inhabits; and whether in Persia or India, it is held to be the noblest of game. Sometimes the falcon is trained to aid in the chase of the Wild Ass, but the usual method of securing this animal is to drive it towards rocky ground, and to kill it with a rifle bullet as it stands in fancied security upon some lofty crag.



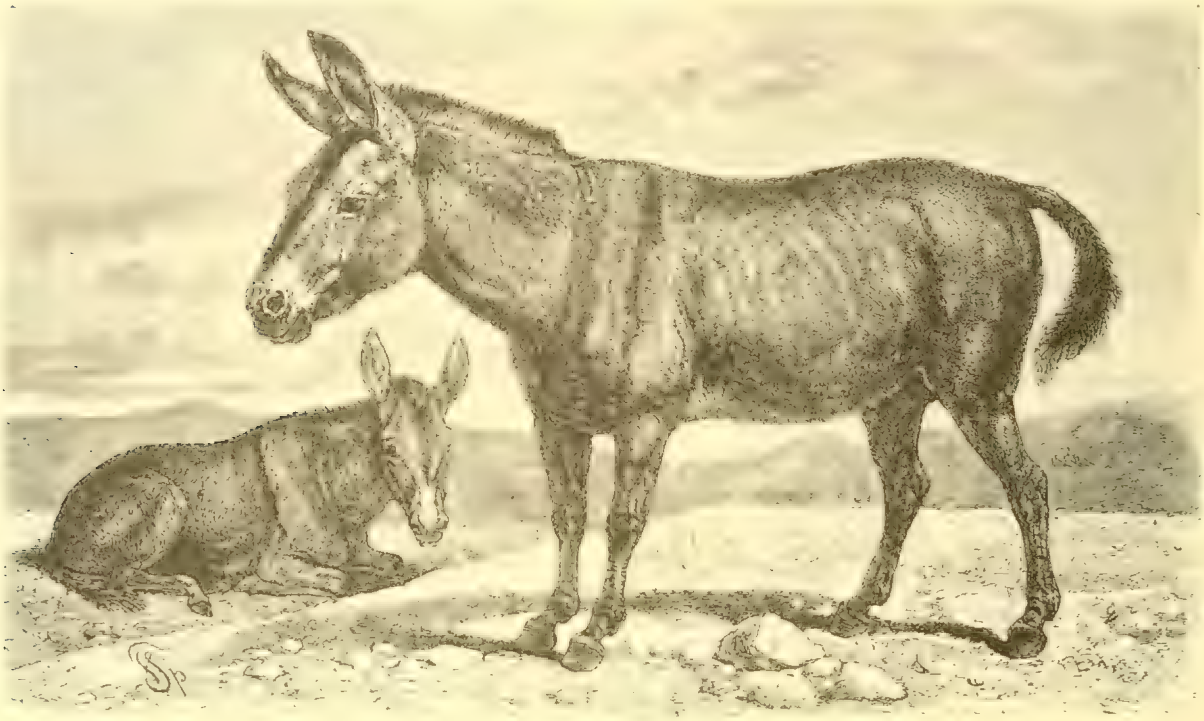
DZIGGETAI, OR KOULAN.—*Asinus onager.*

It lives in troops, descending to the plains during the winter months, and returning to the cooler hills as soon as the summer begins to be unpleasantly warm. It is very common in Mesopotamia, and is always a most shy and wary, as well as swift animal. Each troop is under the command of a leader, who sways his subjects with unlimited authority, and takes upon himself to make all needful arrangements for their welfare.

The honor of success is not the only motive which urges the hunters to pursue the Dziggetai, for its flesh is remarkably excellent, and is universally thought to be one of the greatest dainties. The localities inhabited by this animal are Mesopotamia, Persia, the shores of the Indus, and the Punjâb. The color of this animal is pale reddish-brown in the summer, fading into a gray-brown in the winter, and marked with a black stripe along the spine, becoming wider upon the middle of the back.

ANOTHER species of Wild Ass is the KIANG, or Wild Ass of Thibet, sometimes, but erroneously, called the Wild Horse of Thibet, because its noise resembles the neighing of that animal rather than the braying of the ass.

The Kiang inhabits the high table-lands of its native country, and is wonderfully fleet and active in traversing level or uneven ground. It is a rather large animal; a full-sized adult from Chinese Tartary measuring fourteen hands in height at the shoulder. It lives in little troops of eight or ten in number, and is found in districts where the cold is most intense, the thermometer falling below zero in the localities which are most frequented by them. As they pass their lives in such a climate, they are necessarily furnished with warm, woolly coats, which are of different color and thickness, according to the time of year. In the summer the fur is short, smooth, and of a light reddish-brown, but in winter the hair becomes long and rather woolly, and fades into a light gray brown. The legs too change the tinting, being straw-colored in summer and whitish in winter. A broad black line is drawn along the back, but there is no transverse band across the shoulders, nor are their young marked with zebra-like stripes, as is the case with the young Dziggetai.



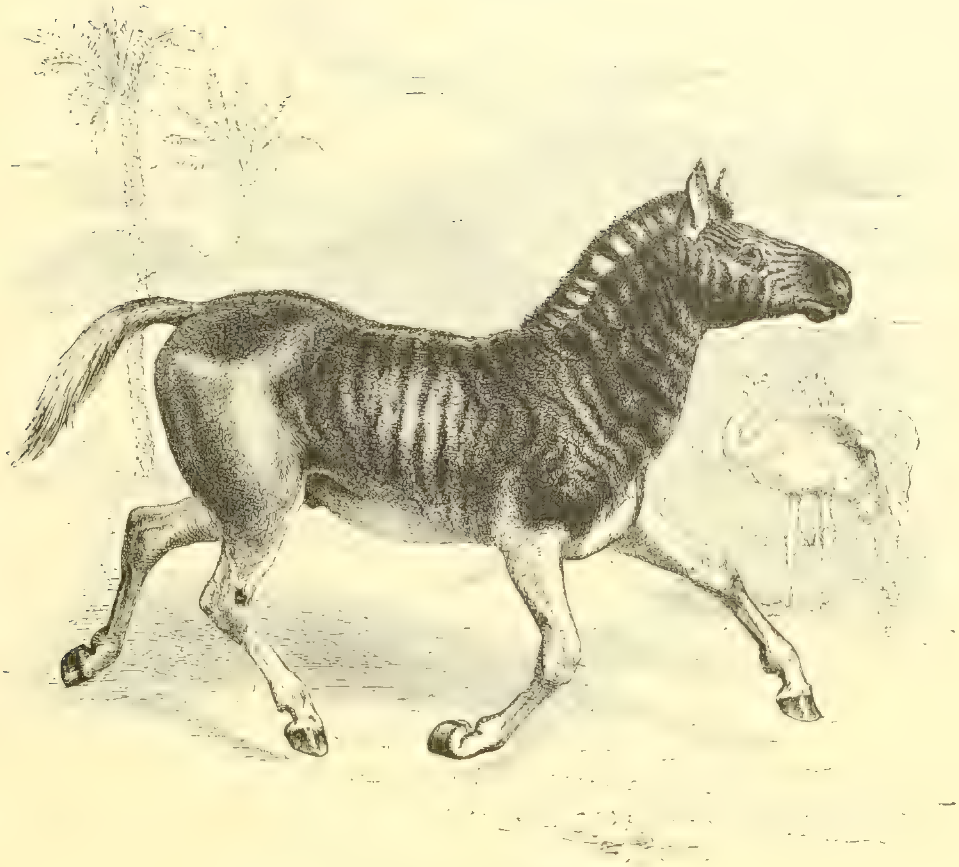
AFRICAN WILD ASS.—*Asinus tæniopus.*

It is a swift and wary animal, fleeing in terror before the hunter, and yet stopping at intervals to gaze on the object of its alarm. Unless the hunter is very sure of his aim, he will not risk a shot, for the animals are so terrified by the report and the flash that they forget their curiosity in their fear, and gallop away at the best of their speed, which soon carries them out of danger. It is capable of domestication, and can be put in training like a horse or a domestic ass.

Africa produces some most beautiful examples of the Wild Asses, equalling the Asiatic species in speed and beauty of form, and far surpassing them in richness of color and boldness of marking.

The Quagga looks at first sight like a cross between the common wild ass and the zebra, as it only partially possesses the characteristic zebra-stripes, and is decorated merely upon the hind and fore-parts of the body. The streaks are not so deep as they are in the zebra, and the remainder of the body is brown, with the exception of the abdomen, legs, and part of the tail, which are whitish-gray. The Quagga lives in large herds, and is much persecuted by the natives of Southern Africa, who pursue it for the sake of its skin and its flesh, both of which are in high estimation.

DAUW.



QUAGGA.—*Asinus quagga.*

A NEARER approach to the true zebra is seen in the animal which is indifferently termed the DAUW, the PEECHI, or BURCHELL'S ZEBRA. This species is an inhabitant of Southern Africa, where it is found in large herds south of the Orange River. Unlike the wild ass of Asia, the Dauw keeps aloof from the rocky and hilly districts, and is only found on the plains, where it wanders in company with ostriches, various antelopes, and other strange comrades. The general appearance of this species bears a considerable resemblance to that of the zebra, from which animal it may be immediately distinguished by the color, number, and extent of the dark stripes and bands. In the Dauw, the stripes are not so black as in the zebra, and instead of covering the entire body and limbs, they only extend over the head, neck, body, and the upper portions of the legs. The general color of the fur is a pale-brown, becoming grayish-white upon the abdomen and inner faces of the limbs.

Like many other gregarious animals of Southern Africa, the Dauw is found to make periodical migrations, for the purpose of supporting itself with the food that has failed in its original district. In times of scarcity the Dauw, together with several species of antelope, visits the cultivated lands, and makes sad havoc among the growing crops. When rain has fallen, and the forsaken districts have regained their fertility, the Dauw leaves the scene of its plunder, and returns to its ancient pasturage.

The Dauw is capable of a partial domestication, and can be tamed to a considerable extent. It is, however, considered as possessing a tetchy and uncertain temper, and is of too obstinate a disposition to be of much use to man. By the Matabili and Bechuana Kaffirs it is called Peet-sey, and the Dutch colonists have given it the name of Bontequagga.

AMONG all the species of the Ass tribe, the ZEBRA is by far the most conspicuous and the most beautiful.

The general color of the Zebra is a creamy white, marked regularly with velvety black stripes that cover the entire head, neck, body, and limbs, and extend down to the very feet. It is worthy of note, that the stripes are drawn nearly at right angles to the part of the body on which they occur, so that the stripes of the legs are horizontal, while those of the body are vertical. The abdomen and inside faces of the thighs are cream-white, and the end of the tail is nearly black. This arrangement of coloring is strangely similar to that of the tiger, and has earned for the animal the name of "Hippotigris," or Horse-tiger, among some zoologists, ancient and modern. The skin of the neck is developed into a kind of dewlap, and the tail is sparingly covered with coarse black hair. By the Cape colonists it is called "Wilde Paard," or Wild Horse.

At the best of times the flesh of the Zebra is not very inviting, being rather tough, coarse, and of a very peculiar flavor. The Boers, who call themselves by the title of "baptized men," think they would be derogating from their dignity to partake of the flesh of the Zebra, and generously leave the animal to be consumed by their Hottentot servants. When wounded, the Zebra gives a kind of groan, which is said to resemble that of a dying man.

ZEBRA.—*Asinus zebra.*

In disposition the Zebra is fierce, obstinate, and nearly untamable. The efforts used by Mr. Rarey in reducing to obedience the Zebra of the Zoological Gardens are now matter of history. The little brindled animal gave him more trouble than the huge savages on whom he had so successfully operated, and it overset some of his calculations by the fact that it was able to kick as fiercely from three legs as a horse from four.

In its habits the Zebra resembles the dziggetai more than the dauw, as it is always found in hilly districts, and inhabits the high craggy mountain ranges in preference to the plains. It is a mild and very timid animal, fleeing instinctively to its mountain home as soon as it is alarmed by the sight of a strange object.

Between the zebras and the domestic ass several curious Mules have been produced. It is worthy of notice, that wherever a cross breed has taken place, the influence of the male parent seems to be permanently impressed on the mother, who in her subsequent offspring imprints upon them some characteristic of the interloper.

THE ELEPHANTS.

The important family of the Elephantidæ is allied, according to the catalogue of the British Museum, to the Elephants, Tapirs, Swine, Hyrax, Rhinoceros, and Hippopotamus. All these animals, however different their aspect, are nearly related to each other by means of certain members of the family, which, although now extinct, have been recovered through the assistance of geological researches.

Of Elephants, two distinct species are found in different continents, the one inhabiting Asia, and the other taking up its residence in Africa. According to some zoologists, these animals belong to different genera, but the distinctions between the two creatures are not sufficiently determined to warrant such a suggestion. Although the Asiatic and African Elephants are very similar in external form, they may at once be distinguished from each other by the dimensions of the head and the size of the ear. In the Asiatic animal, the head is elongated, the forehead concave, and the ears of ordinary size, while in the African Elephant the head is much shorter, the forehead convex, and the ears of enormous magnitude, nearly meeting on the back of the head, and hanging with their tips below the neck.

The molar teeth also afford excellent indications of the country to which their owner has belonged, for the enamel upon the surface of the teeth of the Asiatic Elephant is moulded into a number of narrow bands like folded ribands, while that of the African species is formed into five or six diamond or lozenge shaped folds. Indeed, each molar tooth seems to be composed of a number of flat, broad teeth, which are fastened closely together, so as to form a single large mass. Only a portion of each tooth is externally visible, the remainder being hidden in the jaw, and moving forward as the exposed portion is worn away. When the whole tooth is thus worn out, it falls from the jaw, and its place is taken by another which has been forming behind it. In this manner the Elephant sheds its molar teeth six or seven times in the course of its life. The tusks, however, are permanent, and are retained during the whole of the animal's existence. There are a pair of small "milk-tusks" when the Elephant is in its childhood, but these are soon shed and replaced by the true tusks. In the Indian Elephant only the males are furnished with tusks, and not every individual of that sex, whereas in the African species both sexes are supplied with these valuable appendages, those of the male being much larger and heavier than those of his mate.

The Elephant, whether Asiatic or African, always lives in herds, varying greatly in numbers, and being always found in the deepest forests, or in their near vicinity. Both species are fond of water, and are never found at any great distance from some stream or fountain, although they can and do make tolerably long journeys for the purpose of obtaining the needful supply of liquid. They have a curious capability of laying up a store of water in their interior, somewhat after the fashion of the camel, but possess the strange accomplishment of drawing the liquid supply from their stomachs by means of their trunks, and scattering it in a shower over their backs in order to cool their heated bodies. When drinking, the Elephant inserts the tip of his trunk into the stream, fills its cavities with water, and then, turning his trunk so as to get the extremity well into his throat, he discharges its contents fairly into his stomach, where it may be heard to splash by any one who is in near proximity to the animal.

The strangest portion of the Elephant's form is the trunk, or proboscis. This wonderful appendage is in fact a development of the upper lips and the nose, and is perforated through its entire length by the nostrils, and is furnished at its extremity with a kind of finger-like appendage, which enables the animal to pluck a single blade of grass, or to pick a minute object from the ground. The value of the proboscis to the Elephant is incredible ; without its aid the creature would soon starve. The short, thick neck would prevent it from stooping to graze, while the projecting tusks would effectually hinder it from reaching any vegetables which might grow at the level of its mouth. And as it would be unable to draw water into its mouth without the use of the trunk, thirst would in a very short time end its existence.

As the trunk is required for so many purposes, it must needs be capable of extension, contraction, and of flexibility in every direction, as well as possessed of enormous strength. In order to effect these conditions, the trunk is composed of no less than fifty thousand distinct muscles, some of which run longitudinally along the axis of the proboscis, and others radiate from the centre to the circumference. When the trunk is at rest, its surface is covered with a series of thick, transverse wrinkles or corrugations, which become less distinct as this appendage is gradually stretched, and vanish entirely when it is extended to its full length. The little finger-like appendage at its tip is slightly different in shape in the two sexes.

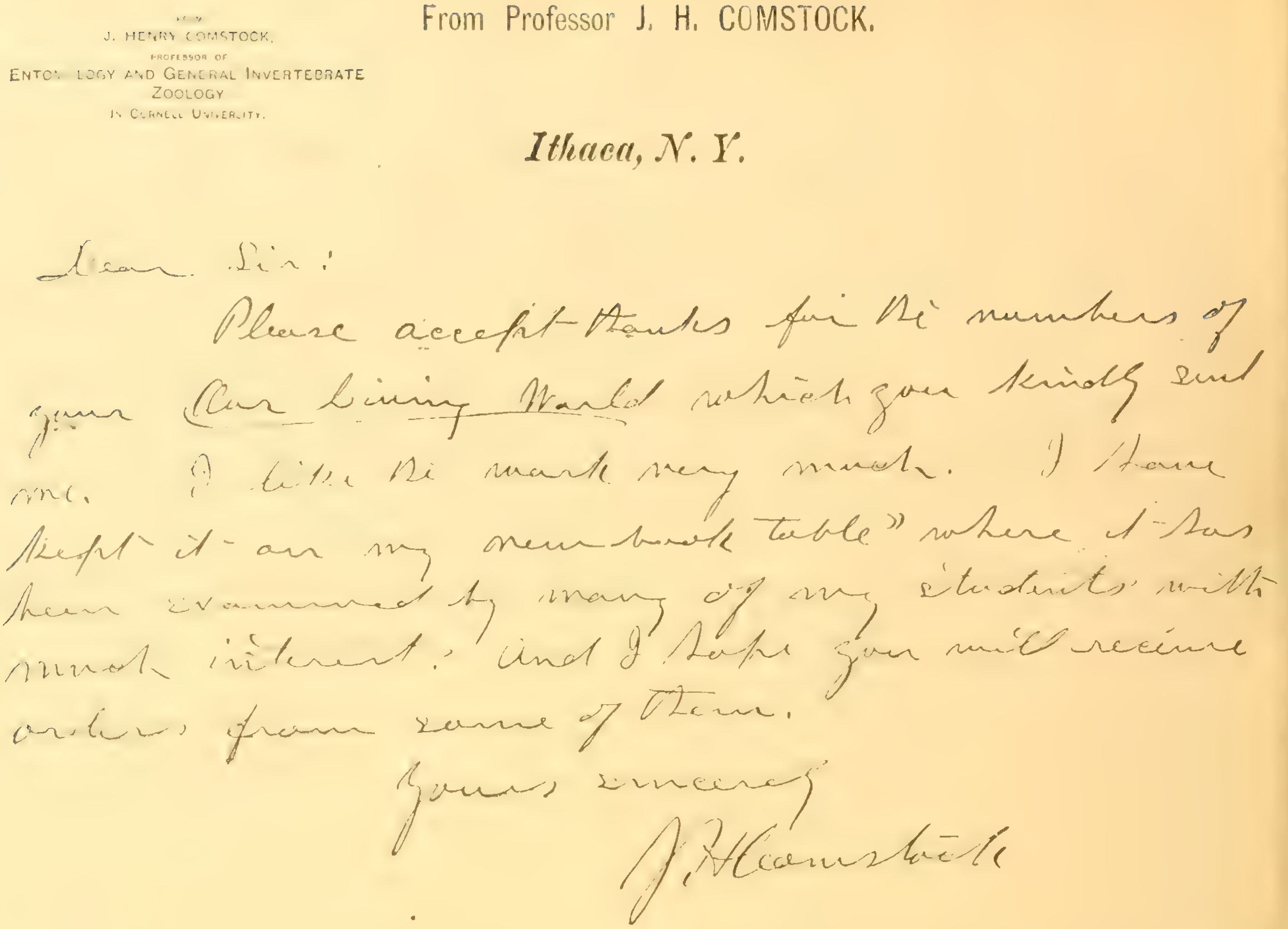
In order to support the enormous weight of the teeth, tusks, and proboscis, the head is required to be of very large dimensions, so as to afford support for the powerful muscles and tendons which are requisite for such a task. It is also needful that lightness should be combined with magnitude, and this double condition is very beautifully fulfilled. The skull of the Elephant, instead of being a mere bony shell round the brain, is enormously enlarged by the separation of its bony plates, the intervening space being filled with a vast number of honeycomb-like bony cells, their walls being hardly thicker than strong paper, and their hollows filled during the life of the animal with a kind of semi-liquid fat or oil. The brain lies in a comparatively small cavity within this cellular structure, and is therefore defended from the severe concussions which it would otherwise experience from the frequency with which the animal employs its head as a battering-ram. It is easy to understand the difficulty of killing an Elephant by aiming at the head, for unless the shot be directed towards one of the apertures which lead to the brain, such as the eye, the ear, or the nostril, the bullet only enters the mass of bony cells, and does comparatively little damage. It is worthy of observation, that as the skull of the Asiatic and African Elephant is different in shape, a bullet which will destroy one animal might have little effect on the other.

In order to support the enormous weight which rests upon them, the legs are very stout, and are set perpendicularly, without that bend in the hinder leg which is found in most animals. There is no elongated cannon-bone in the Elephant, so that the hind-legs are without the so-called knee-joint. This structure, however, is of infinite use to the animal when it climbs or descends steep acclivities, a feat which it can perform with marvellous ease. It may seem strange, but it is nevertheless true, that localities which would be totally inaccessible to a horse are traversed by the Elephant with perfect ease.

In descending from a height, the animal performs a very curious series of manœuvres. Kneeling down, with its fore-feet stretched out in front, and its hinder legs bent backward, as is their wont, the Elephant hitches one of its fore-feet upon some projection or in some crevice, and bearing firmly upon this support, lowers itself for a short distance. It then advances the other foot, secures it in like manner, and slides still farther, never losing its hold of one place of vantage until another is gained. Should no suitable projection be found, the Elephant scrapes a hole in the ground with its advanced foot, and makes use of this artificial depression in its descent. If the declivity be very steep, the animal will not descend in a direct line, but makes an oblique track along the face of the hill. Although the description of this curious process occupies some time, the actual feat is performed with extreme rapidity.

Though the foot of an Elephant is extremely large, it is most admirably formed for the purpose which it is destined to fulfil, and does not, as might be supposed, fall heavily upon the ground. The hoof that incloses the foot is composed of a vast number of horny plates that are arranged on the principle of the common carriage-spring, and seem to guard the animal from the jarring shock of the heavy limb upon the soil. Those who for the first time witness the walk or the run of the Elephant, are always surprised at the silent ease of the creature's free, sweeping step. As there is no short ligament in the head of the thigh-bone, the hind-foot is swung forward at each step, clearing the ground easily, but being scarcely raised above the surface of the earth.

From Professor J. H. COMSTOCK.



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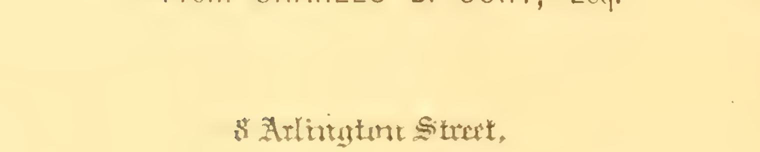

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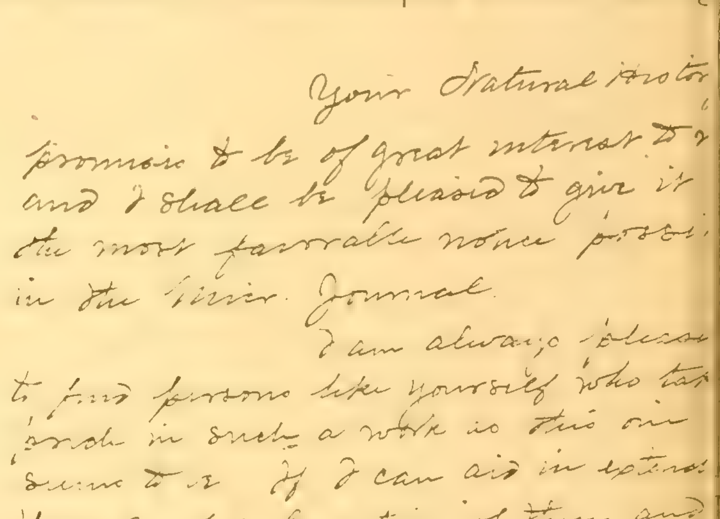

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Having thus given a short sketch of the characteristics which are common to both species of Elephants, I will proceed to a short account of the Asiatic animal.

THE ASIATIC ELEPHANT bears a world-wide fame for its capabilities as a servant and companion of man, and for the extraordinary development of its intellectual faculties. Hundreds of these animals are annually captured, and in a very short period of time become wholly subjected to their owners, and learn to obey their commands with implicit submission. Indeed, the power of the human intellect is never so conspicuous as in the supremacy which man maintains over so gigantic and clever an animal as the Elephant. In all work which requires the application of great strength, combined with singular judgment, the Elephant is supreme: but as a mere puller and hauler it is of no very great value. In piling logs, for example, the Elephant soon learns the proper mode of arrangement, and will place them upon each other with a regularity that would not be surpassed by human workmen. Sir Emerson Tennent mentions a pair of Elephants that were accustomed to labor conjointly, and which had been taught to raise their wood-piles to a considerable height by constructing an inclined plane of sloping beams, and rolling the logs up the beams. The same writer, in his most valuable work on Ceylon, gives the following curious instance of intelligence in an Elephant:

"One evening, while riding in the vicinity of Kandy, towards the scene of the massacre of Major Davie's party in 1803, my horse evinced some excitement at a noise which approached us in the thick jungle, and which consisted of a repetition of the ejaculation, *Urmph! urmph!* in a hoarse and dissatisfied tone. A turn in the forest explained the mystery, by bringing me face to face with a tame Elephant, unaccompanied by any attendant. He was laboring painfully to carry a heavy beam of timber, which he balanced across his tusks, but the pathway being narrow, he was forced to bend his head to one side to permit it to pass endways; and the exertion and inconvenience combined led him to utter the dissatisfied sounds which disturbed the composure of my horse.

"On seeing us halt, the Elephant raised his head, reconnoitred us for a moment, then flung down the timber, and forced himself backwards among the brushwood, so as to leave a passage, of which he expected us to avail ourselves. My horse still hesitated: the Elephant observed, and impatiently thrust himself still deeper into the jungle, repeating his cry of *urmph!* but in a voice evidently meant to encourage us to come on. Still the horse trembled; and, anxious to observe the instinct of the two sagacious creatures, I forbore any interference: again the Elephant wedged himself farther in amongst the trees, and waited impatiently for us to pass him, and after the horse had done so, tremblingly and timidly, I saw the wise creature stoop and take up his heavy burden, turn and balance it on his tusks, and resume his route, hoarsely snorting, as before, his discontented remonstrance."

Another Elephant of Ceylon performed a feat of equal sagacity.

By profession he was a builder, and was employed in laying stones under the supervision of an overseer. Whenever he completed one course, he signalled to the overseer, who came and inspected his work, and after ascertaining that the task was properly performed, gave the signal to lay another course. On one occasion, the Elephant placed himself against a portion of the wall, and refused to move from the spot, when the overseer came to the part of the wall which his body concealed. The overseer, however, insisted on the animal's moving aside, and the Elephant, seeing that his ruse had failed, immediately set hard to work at pulling down the wall which he had just built, and which was defective in the spot which he had been attempting to conceal from the inspector's eye.

Although so valuable an animal for certain kinds of work, the Elephant is hardly so effective an assistant as is generally supposed. "The working Elephant," says Sir E. Tennent, "is always a delicate animal, and requires watchfulness and care; as a beast of burden he is unsatisfactory; for although in point of mere strength there is hardly any weight which could be conveniently placed on him that he could not carry, it is difficult to pack it without causing abrasions that afterwards ulcerate. His skin is easily chafed by harness, especially in wet weather. Either during long droughts, or too much moisture, his feet are liable to sores, which render him non-effective for months. Many attempts have been made to provide him with some protection for the sole of the foot, but from his extreme weight and mode of planting the foot, they have all been unsuccessful. His eyes are also liable to frequent inflammation. In Ceylon, the murrain among cattle is of frequent occurrence, and carries off great numbers of animals, wild as well as tame. In such visitations, the Elephants suffer severely, not only those at liberty in the forest, but those which are carefully tended in the Government stables.

"On being first subjected to work, the Elephant is liable to severe and often fatal swellings of the jaws and abdomen. On the whole, there may be a question as to the prudence or economy of maintaining a stud of Elephants for the purposes to which they are assigned in Ceylon. In the rude and unopened parts of the country—where rivers are to be forded, and forests are only traversed by jungle paths—their labor is of value in certain contingencies, in the carrying of stores and in the earlier operations for the construction of fords and bridges of timber. But in more highly civilized districts, and wherever macadamized roads admit of the employment of horses and oxen for draught, I apprehend that the services of Elephants might, with advantage, be probably reduced, if not altogether dispensed with." The able writer then proceeds to observe that if the peculiar constitution, irritability, and expensive maintenance of the Elephant be taken into consideration, the value of its labor will be found to be less than that of a good draught horse. The keep of an Elephant in Ceylon costs from $1.50 to $1.75 per diem, and the animal can only work, on an average, four days in each week, while the keep of a powerful dray horse, which works five days in the week, is only about 60 cents per diem.

The general disposition of the Asiatic Elephant is gentle, but there are always some stray individuals that are not admitted into any herd, but live in solitary moodiness, and are termed "rogues," from their irritable temper. So gentle, indeed, is their nature, that even when most irritated by wounds, they literally do not know how to kill their foe, even if he is lying at their mercy, and there are many instances where hunters who have been chased and struck down by these animals, have escaped without suffering any serious damage. The tusks are seldom employed as offensive weapons, and the Elephant has but little idea of directing them towards an adversary. A momentary pressure of the foot, or a blow with the tusk, would in any case be sufficient to cause death, but the animal seems to be scarcely aware of its own power, and often contents itself with kicking its prostrate foe from foot to foot, hustling him between the fore and hinder limbs in a very unpleasant manner. A little Indian Elephant, that had been much worried by wild boars, was accustomed to defeat them by receiving their charge, and then knocking them about from foot to foot until they were effectually disabled.

There are two modes of capturing the Asiatic Elephant, the one by pursuing solitary individuals and binding them with ropes as they wander at will through the forests, and the other by driving a herd of Elephants into a previously prepared pound, and securing the entrance so as to prevent their escape.

In the former method, the hunters are aided by certain trained females, termed "koomkies," which enter into the spirit of the chase with wonderful animation, and help their riders in every possible manner. When the koomkies see a fine male Elephant, they advance carelessly towards him, plucking leaves and grass, as if they were perfectly indifferent to his presence. He soon becomes attracted to them, when they overwhelm him with endearing feminine blandishments, and occupy his attention so fully that he does not observe the proceedings of the "mahouts," or riders. These men, seeing the Elephant engaged with the "koomkies," slip quietly to the ground, and attach their rope nooses to his legs, fastening the ends of the cords to some neighboring tree. Should no suitable tree be at hand, the koomkies are sagacious enough to comprehend the dilemma, and to urge their victim towards some large tree which is sufficiently strong to withstand his struggles. As soon as the preparations are complete, the mahouts give the word of command to the koomkies, who move away, leaving the captive Elephant to his fate.

Finding himself deserted and bound, he becomes mad with rage, and struggles with all his force to get free. In these furious efforts, the Elephant displays a flexibility and activity of body that are quite surprising, and are by no means in accordance with the clumsy,

ASIATIC ELEPHANT.

stiff aspect of its body and limbs. It rolls on the ground in despair, it rends the air with furious cries of rage, it butts at the fatal tree with all its force, in hope of bringing it to the ground, and has been known to stand with its hind legs fairly off the ground, in its furious endeavors to break the rope. After a while, however, it finds its exertions to be totally useless, and yields to its conquerors. Formerly it was allowed to remain in its captivity until reduced by hunger, but as the ropes are apt to cut severely into the ankle, and to cause painful and dangerous wounds, the time of bondage is now shortened as much as possible, and the animal removed to another spot where ropes are needless. The koomkies afford invaluable assistance both in tying the animal and in leading him away from the tree to which he had been bound. One of these animals is reported to have gone on a solitary hunting expedition on her own account, and to have captured a fine male Elephant, which she tied to a tree with some iron chains.

The second mode of capturing Elephants is more complicated, and secures a greater number of beasts at a time, but as it necessarily includes the young, the old, and the vigorous of both sexes in the general seizure, its results are not so admirable as might be anticipated.

The inclosure into which the Elephants are driven is termed a "keddah," and is ingeniously constructed of stout logs and posts, which are supported by strong buttresses, and are so arranged that a man can pass through the interstices between the logs. When the keddah is set in good order, a vast number of hunters form themselves into a huge circle, inclosing one or more herds of Elephants, and moving gradually towards the inclosure of the keddah, and arranging themselves in such a manner as to leave the entrance towards the keddah always open. When they have thus brought the herd to the proper spot, a business which will often consume several weeks, the Elephants are excited by shouts, the waving of hands and spears, etc., to move towards the inclosure, which is cunningly concealed by the trees among which it is built. If the operation should take place at night, the surrounding hunters are supplied with burning torches, while the keddah is carefully kept in darkness. Being alarmed by the noise and the flames, the Elephants rush instinctively to the only open space, and are thus fairly brought within the precincts of the keddah, from which they never emerge again save as captives.

The terrified animals run round and round the inclosure, and often attempt a desperate charge, but are always driven back by the torch-bearers, who wave their flaming weapons, and discourage the captured animals from their meditated assault. At last the poor creatures are so bewildered and fatigued, that they gather together in the centre of the keddah, and are then considered to be ready for the professional Elephant-hunters. These courageous men enter the keddah either on foot or upon the backs of their koomkies, and contrive to tie every one of the captives to some spot from whence it cannot move. Most ingenious stratagems are employed by the hunters in this perilous task, the details of which may be found in many works on the subject.

When the natives hunt the Elephant merely for the sake of his ivory or his flesh, and do not care to take him alive, they achieve their object by stealing cautiously upon him as he dozes, and by gently tickling one of his hind-feet with a slight twig they induce him to lift the foot from the ground. As soon as he does so, the hunters, who are furnished with a mallet and a sharp wooden spike about eight inches in length, drive the spike into his foot, and effectually lame him with a single blow. He is then quite at their disposal, and is easily despatched. The flesh of the Elephant is thought to be very poor indeed; but the heart, the tongue, the trunk, and the foot, are considered to be good eating if properly dressed.

The "points" of a good Elephant are as important in India and Ceylon as those of a horse in Europe. In a native work upon the Elephant, quoted by Sir E. Tennent, the points are given as follows:—"The softness of the skin, the red color of the mouth and tongue, the forehead expanded and full, the ears large and rectangular, the trunk broad at the root, and blotched with pink in front, the eyes light and kindly, the cheeks large, the neck full, the back level, the chest square, the fore-legs short and convex in front, the hind-quarters plump, five nails in each foot, all smooth, elastic, and round. An Elephant with all these perfections will impart glory and magnificence to the king."

The herds in which these animals congregate are not of very great size, containing only from ten to twenty or thirty individuals, and consisting, as is generally thought by men of practical experience, of members of the same family. This opinion is strengthened by the fact that certain physical peculiarities, such as the shape of the trunk or the head, have been found in every member of the same herd. Sometimes these herds will associate with each other for a time, but at the smallest alarm each little flock assembles together independently of the others. It is rather remarkable that a whole herd has never been known to charge a foe simultaneously. The leader generally faces the enemy, while the remainder of the herd manœuvre in his rear; but that the entire herd should unite in a charge, is a circumstance never yet known to occur. The Asiatic Elephant will permit the temporary society of other animals, and may be seen at a fountain or feeding on an open space in close proximity to deer and wild buffaloes, neither animal displaying any aversion to or fear of the other.

In its general habits the Elephant is restless and irritable, or rather "fidgety," never remaining quite still, but always in motion in some way or other. At one time it will sway backwards and forwards, at another it will stoop and rise continually, or it will be getting sand or water and sprinkling it over its body, or it will pluck a leafy branch and wave it slowly and gracefully over its back. It is very fond of bathing, and has a curious predilection for drawing a mixture of mud and water into its trunk, and discharging it over its body. It is an admirable swimmer, and will cross large rivers with perfect ease. Sometimes it prefers walking on the bed of the river, merely protruding the tip of its proboscis above the surface for the purpose of breathing.

The Indian Elephant is employed more for purposes of state or for sport than for hard labor, and is especially trained for tiger-hunting. As there is a natural dread of the tiger deeply implanted in the Elephant's being, it is no easy matter to teach the animal to approach its brindled foe. A stuffed tiger-skin is employed for this purpose, and is continually presented to the Elephant until he learns to lose all distrust of the inanimate object, and to strike it, to crush it with his feet, or to pierce it with his tusks. After a while, a boy is put inside the tiger-skin, in order to accustom the Elephant to the sight of the tiger in motion. The last stage in the proceedings is to procure a dead tiger, and to substitute it for the stuffed representative. Even with all this training, it most frequently happens, that when the Elephant is brought to face a veritable living tiger, the fierce bounds, savage yells, and furious eyes of the beast are so discouraging, that he turns tail, and makes the best of his way from the spot. Hardly one Elephant out of ten will face an angry tiger.

The Elephant is always guided by a mahout, who sits astride upon its neck and directs the movements of the animal by means of his voice, aided by a kind of spiked hook, called the haunkus, which is applied to the animal's head in such a manner as to convey the driver's wishes to the Elephant. The persons who ride upon the Elephant are either placed in the howdah, a kind of wheelless carriage strapped on the animal's back, or sit upon a large pad, which is furnished with cross ropes in order to give a firm hold. The latter plan is generally preferred, as the rider is able to change his position at will, and even to recline upon the Elephant's back if he should be fatigued by the heavy rolling gait of the animal. The Elephant generally kneels in order to permit the riders to mount, and then rises from the ground with a peculiar swinging motion that is quite indescribable, and is most discomposing to novices in the art. Very small Elephants are furnished with a saddle like that which is used upon horses, and is fitted with stirrups. The saddle, however, cannot be conveniently used on animals that are more than six feet in height.

The size of Elephants has been greatly exaggerated, as sundry writers have given fourteen or sixteen feet as an ordinary height, and have even mentioned instances where Elephants have attained to the height of twenty feet. It is true that the enormous bulk of the animal makes its height appear much greater than is really the case. Eight feet is about the average height of a large Elephant, and nine or ten feet is the utmost maximum to which the creature ever attains.

It is rather remarkable that the Elephants should be so fond of intoxicating liquids as to be induced by the promise of porter, beer, wine or spirits, to perform tricks which it would otherwise refuse to attempt. The natural food of the Elephant consists of grass and various leaves, which it plucks daintily with the tip of its trunk, and always beats against its fore-legs, in order to shake off the dust. While feeding, the Elephant never seems to be in a hurry, but eats deliberately, and often pauses in its meal, as if engaged in contemplation. In this country, the average daily food of an adult Elephant is one truss of hay, one truss of straw, a bushel of barley-meal and bran made into a mash, thirty pounds of potatoes, and six pints of water. In Ceylon, each Elephant employs two men in cutting leaves for its sustenance, and a very large animal would probably require the services of three leaf-cutters.

The general color of the Elephant is brown, of a lighter tint when the animal is at liberty, and considerably deeper when its hide is subjected to rubbing with a cocoa-nut brush, and plenty of oil. Sometimes an albino or white Elephant is seen in the forests, the color of the animal being a pinky-white, and aptly compared to the nose of a white horse. The King of Ava, one of whose titles is "Lord of the White Elephants," generally contrives to monopolize every White Elephant, and employs them for purposes of state, decorating them with strings of priceless gems, pearls, and gold coins, and lodging them in the most magnificent of houses, where their very eating-troughs are of silver.

Although the tame Elephant is usually gentle in his disposition, there are certain times in the year when he becomes greatly excited, and is sometimes so powerfully agitated, that he will attack anything that comes in his way, and has often been known even to assault his own keeper. Elephants in this condition are technically called "must" Elephants, and are carefully guarded as long as the paroxysm lasts. On one occasion, a mahout was forced to sit upon the animal's back for several days continuously, not daring to alight lest the infuriated animal should destroy him. As he sat upon the creature's back, it constantly endeavored to pull him from his seat, but was held at bay by the sharp point of the "haunkus," which wounded his trunk whenever it threatened the mahout, and caused such pain that the animal was fain to desist from its deadly efforts. While in this state of excitement, the Elephant is largely employed as a combatant, being set to fight another "must" animal for the gratification of its owner. Very heavy wagers were often laid upon these combatants by their Eastern owners, and the fight was of a most terrific character. Each Elephant was mounted by his own mahout, who was furnished with a rope netting, to which he clung as the animals met in the deadly shock, in order to prevent himself from being flung off the creature's back. It is a remarkable fact, that the animal never interferes with a human being provided he is mounted upon an Elephant's back, and even the wild "rogue" Elephants do no harm to the men who come to ensnare them.

There are many breeds, or "casts," of the Asiatic Elephant, which are distinguished by certain technical terms.

The African Elephant is spread over a very wide range of country, extending from Senegal and Abyssinia to the borders of the Cape Colony. Several conditions are required for its existence, such as water, dense forests, and the absence of human habitations.

Although it is very abundant in the locality which it inhabits, it is not often seen by casual travellers, owing to its great vigilance, and its wonderful power of moving through the tangled forests without noise, and without causing any perceptible agitation of the foliage. In spite of its enormous dimensions, it is one of the most invisible of forest creatures, and a herd of Elephants, of eight or nine feet in height, may stand within a few yards of a hunter without being detected by him, even though he is aware of their presence. The only sure method of ascertaining the presence of Elephants is by listening for one sound which they are continually giving forth, and which they are unable to control. This peculiar noise resembles the bubbling of wine when poured from a bottle, and is caused by the large amount of water which is stored in their interior. This curious sound is emitted at regular intervals, and forms a sure criterion whereby to judge of the direction in which the creatures may be standing.

At the present day the African Elephant is never captured and domesticated, although there seems to be but little reason for such an omission. In the ancient times, this species was trained for the arts of war and peace as regularly as the Asiatic Elephant, and its present immunity from a life of captivity seems to be the result of the fears or laziness of the natives. The only object in possessing the African Elephant is to procure its valuable tusks and teeth, and to afford nourishment to the native tribes. Before the introduction of fire-arms among the Kaffir tribes, the Elephant was hunted by men armed with assagais, or spears, and after being unrelentingly pursued for several successive days, was at last forced to succumb under the multitudes of missiles which penetrated its body. Now, however, the musket-ball, however rude may be the weapon, does great service to the black hunter, and the Elephant is slain in far less time and in greater numbers than under the old system.

When wounded, the African Elephant is a most formidable animal, charging impetuously in the direction of the foe, and crashing through the heavy forest as if the trees were but stubble. In such a case, the best resource of the hunter is in his dogs, which bay round the infuriated animal, and soon distract his attention. The bewilderment which the Elephant feels at the attacks of so small an animal as a dog is quite extraordinary. He does not seem to know what he is doing, and at one time will try to kneel on his irritating foes, will even push down a tree in hopes of crushing them under its branches. This species is not so readily killed by a single ball as is its Asiatic relative, but instances are not wanting where an African Elephant has been slain by a single ball, which entered by the nostrils, and penetrated to the brain. In chasing this animal, the white hunter always prefers a gun with a very wide bore, as the execution which is done depends more upon the weight of the missile than on the accuracy with which it is sent. One great value of the heavy ball, of two or even three ounces in weight, is, that it will break the leg of the animal, and so render him at once helpless. The bone does not always give way at once when struck by so heavy a ball, but is sure to snap after the animal has made a few paces.

The most deadly gun for Elephant shooting seems to be a breech-loader, either double or single, and carrying a ball weighing not less than two ounces. All the apparatus of ramrod and powder-flask is thus rendered needless, and each charge being separately made up into a cartridge, is inserted into the breech, and is ready for use without the least delay. Very accurate shooting is of no great consequence in the pursuit of this giant game, as the hunter can always approach within a few yards of the animal, and deliver his fire from his horse's back, sheering off if the creature endeavors to charge. The bullets employed in Elephant shooting are always hardened with a mixture of one-eighth of tin or solder, and a steel-pointed bullet would probably be the most deadly missile that ever was employed for the purpose. The shell-bullets might also be used with terrible effect.

The Kaffirs are persevering Elephant-hunters, and are wonderfully expert in tracking any individual by the "spoor," or track, which is made by his footsteps. The foot of a male is easily to be distinguished by the roundness of its form, while that of the female is more oval, and the height of the animal is also ascertained by measurement of the foot-marks, twice the circumference of the foot being equal to the height at the shoulder. The mode by which the natives follow a single Elephant through all the multiplied tracks of his companions is very curious. The sole of each Elephant's foot is marked with certain wrinkles, which are never precisely alike in any two individuals, and may be compared to the minute depressions which are found on the human thumb, and which in more primitive times were employed as an expeditious mode of affixing a sign-manual, by being rubbed with ink and impressed upon the document. The black hunter, therefore, taking a piece of soft clay or earth, works it between his hands into a firm and smooth mass, resembling the footmark in shape, and with the point of a thorn traces upon it a chart of the lines which are found on the Elephant's foot. If he should become bewildered amid the multiplicity of footmarks, he has only to refer to his clay chart, and is guided against the possibility of mistaking one individual for another.

The death of a large Elephant is great matter of congratulation among the natives, who rejoice at the abundant supply of food which will fall to their share. Almost every portion of the animal is used by the Kaffirs, whose strong jaws are not to be daunted its the toughest meat, and whose accommodating palates are satisfied with various portions which would be rejected by any civilized being. Indeed, it seems to be a general rule among savages, that every part of an animal which is most repulsive to civilized tastes, is considered by the savage as a luxury, and in many cases thought too good to be spoiled by cooking. The flesh of the Elephant is dried in order to be formed into "biltongue," or jerked meat, and the fat is jealously preserved, being used in the decoration of the person and rubbed copiously over the head and body. Even the skin is of service to the natives, for beneath the hard, leather-like hide, there lies a tough inner skin, which is carefully removed in large sheets, and is made into vessels for the conveyance of water.

Some portions of the Elephant are, however, grateful even to Christian palates, and the foot, when baked, is really delicious. This part of the animal is cooked by being laid in a hole in the earth, over which a large fire has been suffered to burn itself out, and then covered over with the hot earth. Another fire is then built on the spot, and permitted to burn itself out as before, and when the place is thoroughly cool, the foot is properly cooked. The flesh of the boiled foot is quite soft and gelatinous, something resembling calf's head, and is so tender that it can be scooped away with a spoon. The trunk and the skin around the eye are also enumerated as delicacies, but have been compared by one who has had practical experience, as bearing a close resemblance to shoe-leather both in toughness and evil flavor.

The African Elephant is a most suspicious and wary animal, being very keen of scent and acute of hearing. So sensitive are the animal's olfactory faculties, that it can track a native by the scent of his footsteps, although perhaps it might find a difficulty in following the spoor of a shod and cleanly Christian. However close the Elephant may be, the pursued hunter is always safe if he can only climb a tree, for the animal never thinks of looking elsewhere than on the ground for its foe, and neither by scent nor vision directs its attention to the trees. While employed in thus trailing their enemies, it writhes the trunk into the most singular contortions, fully justifying the epithet of *anguimanus*, or snake-hand, which has so aptly been applied to that member.

The natives employ many methods of capturing Elephants, the pitfall being the most deadly. Even this insidious snare is often rendered useless by the sagacity of the crafty old leaders of the herds, who precede their little troops to the water, as they advance by night to drink, and carefully beating the ground with their trunks as they proceed, unmask the pitfalls that have been dug in their course. They then tear away the coverings of the pits, and render them harmless. These pitfalls are terrible affairs when an animal gets into them, for a sharp stake is set perpendicularly at the bottom, so that the poor Elephant is transfixed by its own weight, and dies miserably. Each pit is about eight feet long by four in width.

Whenever the Elephants approach the water at night, their advent may be at once known by the commotion that arises among the various animals which have also congregated around the pool for the purpose of slaking their thirst. "If the spring or pool," says Mr. Anderson, in his valuable work, "Lake Ngami," "be of small extent, all the animals present will immediately retire from the water as soon as they are aware of the presence of the Elephants, of whom they appear to have an instinctive dread, and will remain at a respectful distance until the giants have quenched their thirst. Thus, long before I have seen or even heard the Elephants, I have been warned of their approach by the symptoms of uneasiness displayed by such animals as happened to be drinking at the time. The giraffe, for instance, begins to sway his long neck to and fro; the zebra utters sudden and plaintive cries; the gnoo glides away with a noiseless step; and even the ponderous and quarrelsome black rhinoceros, when he has time for reflection, will pull up short in his walk to listen: then turning round, he listens again, and if he feels satisfied that his suspicions are correct, he invariably makes off, giving vent to his fear or ire by one of his vicious and peculiar snorts. Once, it is true, I saw a rhinoceros drinking together with a herd of seven male Elephants; but then he was of the white species, and, besides, I do not believe that either party knew of each other's proximity."

The ivory of the African Elephant is extremely valuable, and vast quantities are exported annually. The slaughter of an Elephant is therefore a matter of congratulation to the white hunter, who knows that he can obtain a good price for the tusks and teeth of the animal which he has slain. A pair of tusks weighing about a hundred and fifty pounds will fetch nearly $200 when sold, so that the produce of a successful chase is extremely valuable. One officer contrived to purchase every step in the army by the sale of the ivory which he had thus obtained. On an average, each pair of tusks, taking the small with the great, will weigh about one hundred and twenty pounds.

There is an ingenious but a very cruel method of procuring ivory, which is employed by the Somali. The hunter contrives to crawl towards the Elephant as it is reposing, and with a single stroke of a very sharp sword nearly severs the principal tendon of the hind leg. At the time, the animal thinks little of the wound, evidently supposing it to be caused by the prick of a thorn. In order to rid himself of the supposed thorn, he stamps violently on the ground, and flings out the wounded limb, until the damaged sinew parts, and the Elephant is rendered incapable of locomotion. The hunters do not trouble themselves about the poor beast, knowing that he must soon die of hunger and thirst, as he cannot stir from the spot on which he was wounded. After a sufficient time has elapsed for putrefaction to have done its work, the hunters return to the spot, and easily draw the tusks from the skull. The tail is cut off, and evermore exhibited as a trophy of victory.

THE TAPIRS.

One of the links which unite the elephants to the swine and rhinoceros is to be found in the genus Tapírus. The animals which belong to this genus are remarkable for the prolonged upper lip, which is formed into a kind of small proboscis, not unlike that of the elephant, but upon a smaller scale, and devoid of the finger-like appendage at the extremity. Only two species are at present existing, but the fossil remains of many other species have been discovered, which, by the peculiar length of proboscis and general formation, seem to render the transition from the elephant to the swine less abrupt. The body is heavy and powerful, the skin thick and almost devoid of hair, and the tail is almost wanting.

The common or American Tapir, sometimes called the Mbórebi, is a native of tropical America, where it is found in great numbers, inhabiting the densely wooded regions that fringe the banks of rivers. It is a great water-lover, and can swim or dive with perfect ease. Although a large animal, being nearly four feet in height, and very strongly made, it falls a victim to many destroyers, the jaguar being the most terrible of its enemies. It is said that when the jaguar leaps upon the Tapir's back, the affrighted animal rushes through the brushwood in hopes of sweeping away its deadly foe, and if it be fortunate enough to gain the river's bank, will plunge into the water, and force the jaguar, who is no diver, to relinquish his hold. The tough, thick hide with which the Tapir is covered is of great service in enabling the animal to pursue its headlong course through the forest without suffering injury from the branches. When it runs, it carries its head very low, as does the wild boar under similar circumstances.

In disposition the Tapir is very gentle, and does not attack human beings except when wounded and driven to bay. It then becomes a fierce and determined opponent, and is capable of inflicting severe wounds with its powerful teeth. The hunter's dogs are often dangerously wounded by the teeth of the despairing Tapir. The voice of the Tapir is a curious shrill kind of whistling sound, which is but seldom uttered. The senses of the animal are very acute, and its sight, hearing, and scent appear to be equally sensitive. During the daytime it is seldom seen, preferring to lie quietly hidden in the deep underwood during the hotter hours of the day, and to emerge at night in order to obtain food and meet its companions. The nocturnal journeys which the Tapir will make are of considerable extent, and the animal proceeds straight onwards, heedless of bank or river, surmounting the one and swimming the other with equal ease. The food of the Tapir is generally of a vegetable nature, and consists of young branches and various wild fruits, such as gourds and melons.

The color of the adult Tapir is a uniform brown, but the young is beautifully variegated with yellowish-fawn spots and stripes upon a rich brown-black ground, reminding the observer of the peculiar tinting of the Hood's marmot. The neck is adorned with a short and erect black mane. The Tapir can easily be brought under the subjection of man, and is readily tamed, becoming unpleasantly familiar with those persons whom it knows, and taking all kinds of liberties with them, which would be well enough in a little dog or a kitten, but are quite out of place with an animal as large as a donkey.

The Tapir family, *Tapiridæ*, has two groups or genera, and six species are enumerated. For a long time only two were known, the East Indian and the American. Lately, several species have been discovered in South America; these were all found in the Andes of New Grenada, and Ecuador. A species has also been found in Central America.

AMERICAN TAPIR.—*Tapirus terrestris.*

The common American Tapir (*Tapirus terrestris*) is found in all parts of South America. It is regarded as the largest of South American mammals, measuring sometimes six feet from the snout to the end of the tail. It is nocturnal in habit. Selecting a mate, it lives in pairs during most of the time.

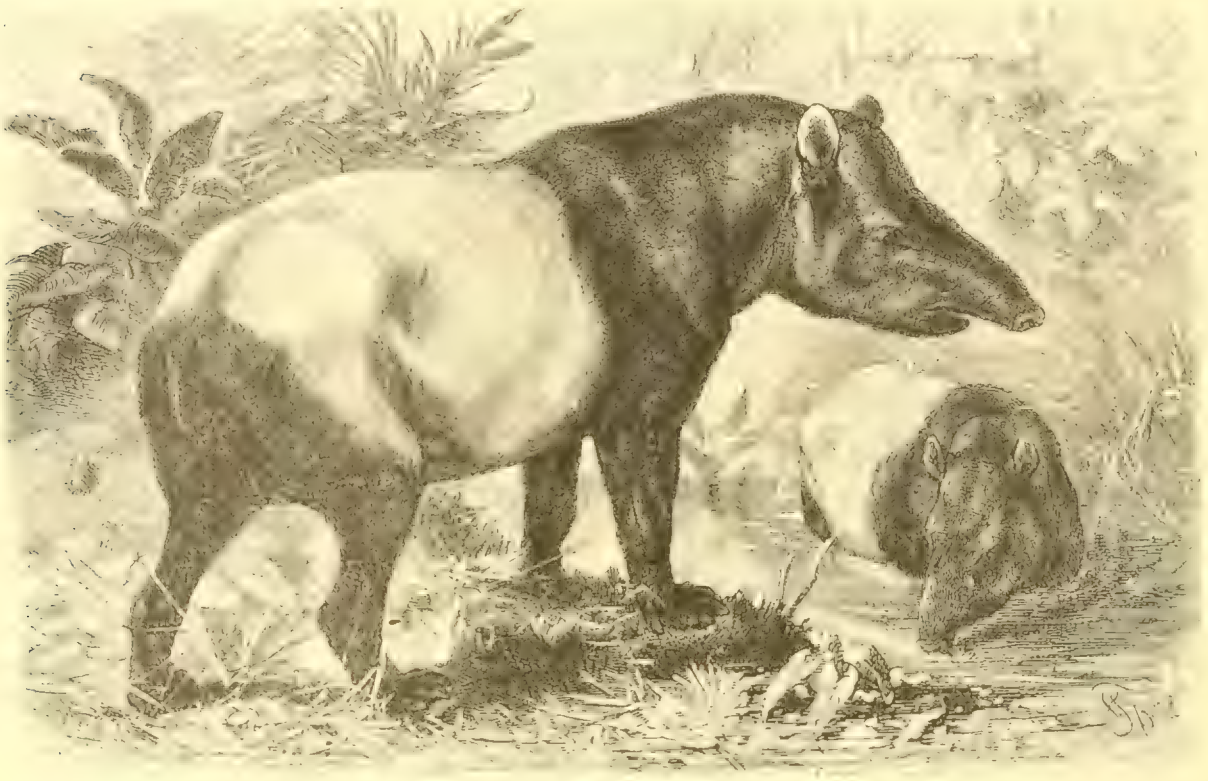
Baird's Tapir (*Elasmognathus bairdi*) is a late discovery in Central America. The specific characters are, a very short fur, close, and dark-brown in color, or nearly black. The lower parts of the cheeks and sides of the neck are a bay-brown; the chin, throat, chest, and front edge of shoulders, a grayish-white.

Like the young of other species of Tapir, the young of this are striped curiously with white, giving an aspect not unlike that of the zebra. This is the only species of the genus known. It is native of the Isthmus of Panama, and extends northward to Mexico. It is regarded as larger than other American species. A variety has been described as a species, and called *E. dowi*, in honor of Captain Dow, a clever collector of California.

Tapirs were common in this country in Eocene time, as well as in other countries. The extinct forms of family *Lophiodontidæ* are allied to them.

The second species of Tapir is found in Malacca and Sumatra, and is a most conspicuous animal, in consequence of the broad band of white that encircles its body, and which at a little distance gives it the aspect of being muffled up in a white sheet.

The ground color of the adult Malayan Tapir is a deep sooty-black, contrasting most strongly with the grayish-white of the back and flanks. The young animal is as beautifully variegated as that of the preceding species, being striped and spotted with yellow fawn upon the upper parts of the body, and with white below. There is no mane upon the neck of the Malayan Tapir, and the proboscis is even longer in proportion. In size it rather exceeds the preceding animal. In many of its habits the Malayan animal is exactly similar to the species which inhabits America, but it is said that although the Kuda-Ayer is very fond of the water, it does not attempt to swim, but contents itself with walking on the bed of the stream. Although a sufficiently common animal in its native country, it is but seldom seen, owing to its extremely shy habits, and its custom of concealing itself in the thickest underwood.



KUDA-AYER, OR MALAYAN TAPIR.—*Tapirus malayanus.*

The hide of the Tapir is employed by the natives for several useful purposes, but the flesh is dry, tasteless, and not worth the trouble of cooking. The term Kuda-Ayer is a Malayan word, signifying "river-horse," and it is also known by the name of Tennu.

SWINE.

In the Swine, the snout is far less elephantine than in the preceding animals, and although capable of considerable mobility, cannot be curled round any object so as to raise it from the ground. Nor, indeed, is such a power needed, as the Swine employ the snout for the purpose of rooting in the earth, and of distinguishing, by its tactile powers, and the delicate sense of smell which is possessed by these animals, those substances which are suitable for its food.

in order to enable this instrument to perform its functions more effectually, it is furnished with a small bone, as is the case with the mole. Their form is heavy and massive, their neck and fore-quarters are very strong, and their heads are wedge-shaped, probably because in a wild state they inhabit dense bushes and thickets, and require this form of head and snout to enable them to pierce the tangled vegetation with ease. A wild boar will charge fearlessly at an apparently impenetrable thicket, and vanish into its interior as if by magic. The tusks, especially in the male, are largely developed, and are terrible weapons of offence, a boar being able to rip up a dog or a man's leg with a single blow of his tusks. When striking with these weapons, the boar does not seem to make any great exertion of strength, but gives a kind of wriggle with his snout as he passes his victim. In India, it is not uncommon for an infuriate wild boar to pursue some unfortunate native, to overtake him as he flies, and putting his snout between the poor man's legs, to cut right and left with an almost imperceptible effort, and to pass on his course, leaving the wounded man helpless on the ground.

There are many species as well as varieties of Swine, which are found in different parts of the earth, the first and most familiar of which is the DOMESTIC HOG.

This species is spread over the greater portion of the habitable globe, and was in former days common in a wild state. The chase of the wild boar was a favorite amusement of the upper classes, and the animal was one of those which were protected by the terribly severe forest laws which were then in vogue. The boar was usually slain with the spear, although the net or the arrow were sometimes employed in his destruction. In several continental countries the boar-hunt is still carried on, and by some more legitimate sportsmen is attacked solely with the spear. The chase is then a most exciting one, for the boar is a terrible antagonist, his charge is made with lightning swiftness, and together with his furious eyes and lips dripping with the foam, he is a sufficiently formidable foe to disconcert any one who is not possessed of good nerves and a steady hand. The animal has an awkward habit of swerving suddenly from his course, snapping at the spear-head and breaking it from the shaft. He also, when the hunter is on horseback, will charge at the horse instead of the rider, and rising on his hind legs, in order to give the blow greater force, will lay open the horse's flank and instantly disable it. There are, however, but few sportsmen of the present day who will restrict themselves to the use of the spear in boar-hunting, but employ the rifle in lieu of that weapon, so that the danger and excitement of the sport are almost entirely destroyed.

Swine are very accommodating in their appetite, and will devour almost any vegetable or animal substance. Although more of a vegetable than an animal feeder, the Hog, whether wild or domesticated, will pick up any dead animal it may find, and will sometimes kill meat for itself. As a specimen of the carnivorous powers of the Swine, Buffon mentions that in the stomach of a wild boar opened by himself, he found part of the skin of a roebuck, and some feet of birds. Certain pig-keepers take a base advantage of the omnivorous qualities of the Hog, and instead of feeding their animals with such a vegetable diet as will produce a firm and sound flesh, maintain them on the worst kind of garbage, which they obtain at a cheap rate from slaughter-houses, and even force them to eat the offal of their own species. The flesh of such ill-fed animals is always flabby and of ill-savor, and is also injurious to those by whom it is consumed.

In this country, the Hog is used not only for food, but for the sake of the hide, which, when prepared after a peculiar fashion, is found to make the best leather for saddles. The bristles are largely used in the manufacture of brushes.

Both to the Jews and the Mahometans the Hog is a forbidden article of diet, the latter prohibition being evidently in imitation of the former. In the Mosaical law the Hog is spoken of as an unclean animal that might not be eaten, although for what reason is not easy to ascertain, and the Rabbinical mandates which exercised such a potent sway over the people laid such a stress upon the interdict that they declared the animal itself to be a vile and foul beast, and pronounced a sentence of uncleanness against those who came in contact with a Hog or with anything which it had touched. It must be remarked, that the Egyptians, among whom the Hebrews had so long resided, held similar views of the Hog, and that might be in deference to their prejudices which they had contracted from their former masters. The Hebrews were taught in their law to hold the animal in the same light in which it had been regarded by those to whom they had been accustomed to look with reverence. By some persons it is thought that the flesh of the Hog is harmful to those who reside in hot countries; but even granting this to be the case—a matter which is by no means certain—it affords no clue to the cause why the Hog should have been held as a vile and unclean beast by the polished and learned Egyptians, who depicted so accurately the various animals found in their country, and employed them so largely in their symbolical literature.

In its wild and domesticated state, the Hog is a most prolific animal, producing from eight to twelve pigs twice in each year, when it is in full vigor and in good health. Gilbert White records a sow which, when she died, was the parent of no less than three hundred pigs.

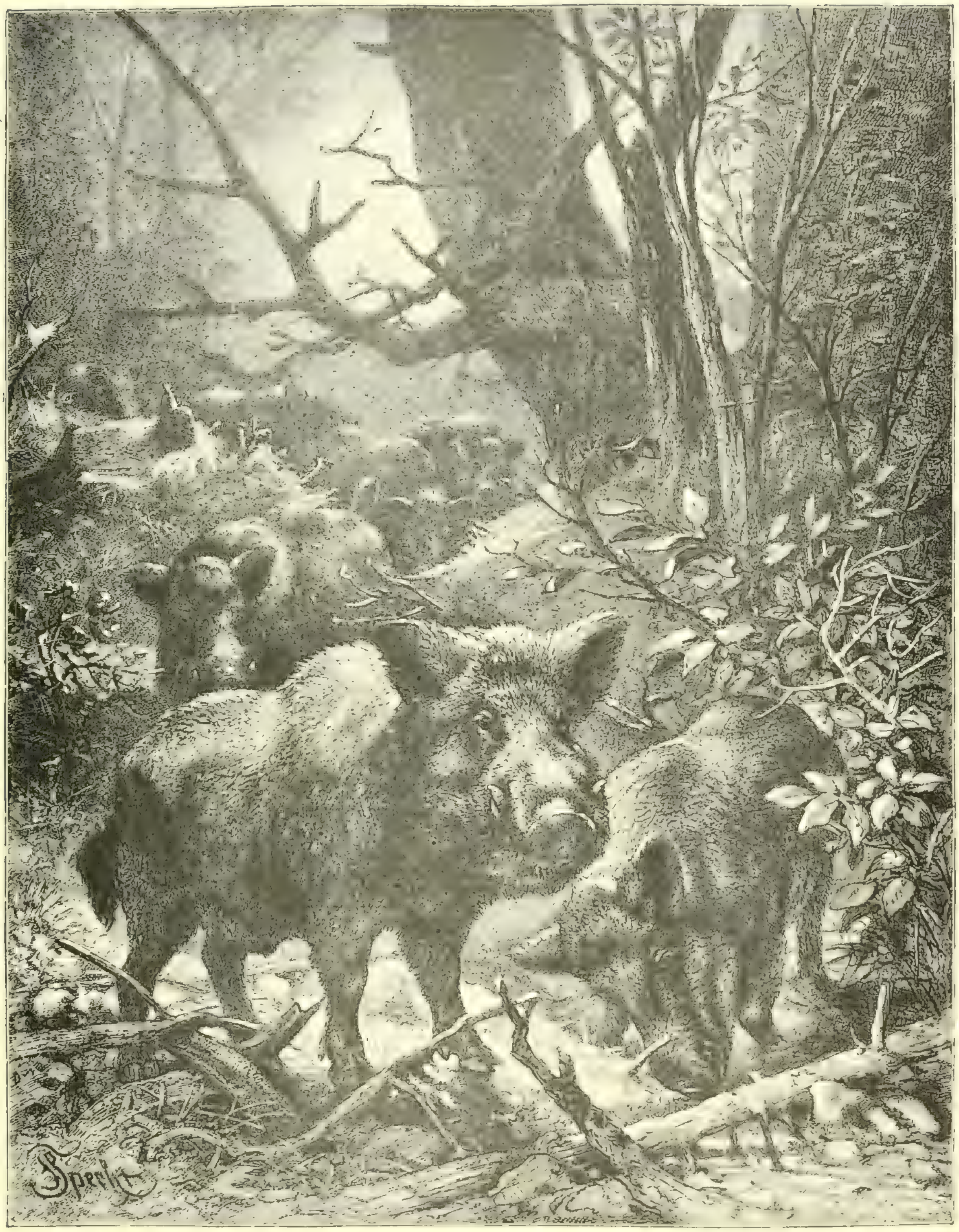
We are rather apt to speak libellously of the Hog, and to ascribe to it qualities which are of our own creation. Although it is a large feeder, it really is not more gluttonous than the cow, the dog, or the sheep, for each of these animals will eat to repletion if furnished with a large amount of food, and will become inordinately fat in consequence of such high feeding. In its wild state it is never found overloaded with fat, and, as has already been seen, is so active an animal that it can surpass a horse in speed, and is so little burdened with flesh that it can endure throughout a lengthened chase. Neither is it naturally a dirty creature, for in its native woods it is as clean as any other wild animal. But when it is confined in a narrow stye, without any possibility of leaving its curtailed premises, it has no choice, but is perforce obliged to live in a constant state of filth.

The Hog is also thought, and very wrongly, to be an especially stupid animal. It appears stupid for the same reason that it appears to be gluttonous and dirty, merely because no attention has been paid towards developing its intellectual qualities, which have been left to exercise themselves in the narrow confines of the stye and on the daily supply of food.

When, however, its owner chooses to look upon the Hog as a living being, and not merely as a piece of animated pork or bacon, he finds that it is by no means the stupid animal that it has been supposed to be. "Learned" pigs are familiar to us all, and though the animal does not display any very great amount of literature, it exhibits a capacity of observation and obedience which would hardly have been expected from so maligned an animal.

The senses of the Hog are wonderfully acute, and are capable of being turned to good purport. So delicate is its sense of smell, that it has been trained to act as a pointer, and in this capacity acted its part so thoroughly, that it would often find birds which the dogs had missed. "Slut," as this animal was called, was very fond of the sport, and would frequently walk a distance of seven miles in hopes of finding some one who was going out with a gun. She would point at every kind of game with the curious exception of the hare, which she never seemed to notice. Although she would willingly back the dogs, they were very jealous of her presence, and refused to do their duty when she happened to be the discoverer of any game, so that she was seldom taken out together with dogs, but was employed as a solitary pointer. So sensitive was her nose, that she would frequently point a bird at a distance of forty yards, and if it rose and flew away, she would walk to the place from which it had taken wing, and put her nose on the very spot where it had been sitting. If, however, the bird only ran on, she would slowly follow it up by the scent, and when it came to a stop, she would again halt and point towards it. She was employed in the capacity of pointer for several years, but was at last killed because she had become a dangerous neighbor to the sheep.

The Hog has also been trained to draw a carriage, a team of four Hogs having been driven by a farmer into the market-place of St. Alban's. After driving once or twice round the market-place, he unharnessed his team, fed them, and in two hours put them again to his chaise, and drove them back to his house, a distance of two or three miles. Absurd as the idea may seem, the Hog has been trained for the saddle as well as for harness. Another farmer laid a heavy wager that he would in one hour ride his boar pig a distance of four miles and a quarter. He won his wager easily, accomplishing the distance in less than the given time. The Hog seems to be a good leaper, for a livery-stable keeper, who petted a favorite pig, engaged that he could make his pig leap over a door four feet and a half in height. In order to induce the animal to make the effort, he placed the door across the entrance to the



WILD BOAR.

stye, and laid a bounteous supply of favorite food within the inclosure. A wild boar has been known to clear a paling nearly nine feet in height, and it is remarkably active in leaping across ravines.

There is a prevalent idea, that whenever the Hog takes to the water he cuts his own throat with the sharp hoofs of his fore-feet. This, however, is by no means the case, for the animal is an admirable swimmer, and will often take to the water intuitively. In one of the Moray Islands, three domestic pigs, belonging to the same litter, swam a distance of five miles; and it is said that if they had belonged to a wild family, they would have swum to a much greater distance.

The flesh and fat of the Hog is especially valuable on account of its aptitude for taking salt without being rendered hard and indigestible by the process; and the various breeds of domesticated Swine are noted for their adaptation to form pork or bacon in the shortest time and of the best quality. A full account of the various English varieties, together with the mode of breeding them and developing their peculiar characteristics, may be found in many books which are devoted specially to the subject.

THE WILD BOAR of India is reckoned by some naturalists to be a separate species, and deserves a few words on account of its superiority in size, strength, and swiftness, to the ordinary European Swine.

This animal is a sad plague to the agricultural population of India, as it makes terrible havoc among the crops, and is especially fond of frequenting the sugar-canes, eating them and chopping them into short lengths, which it forms into hut-like receptacles for its young. The Boar is a most fierce and savage animal, and if driven from the cane-brake, will rush at man, or animal, that may be within his reach, and cut him terribly with his sharp tusks. Even the sow can do considerable damage with her teeth, but instead of ripping, like her mate, she bites sharply and rapidly. When the animal is fairly roused, and takes to his heels, he puts the mettle of the swiftest and stanchest horse fairly to the test, and even on ground where the horse has all the advantage, he will frequently distance his pursuers, and regain his domicile in the cane-brake. Among the plantations are numbers of old disused wells, the sides of which have fallen in and were never properly filled up. In these wells the wild hog loves to lie, for the mouth of the well is so overgrown with thick verdure that the aperture is scarcely visible even to a person that stands on its brink, while from those who are not aware of its precise locality it is entirely hidden.

The spear is generally employed in Boar-hunting, or "pig-sticking," as the sport is familiarly termed, and is either thrown from the horse's back, or is held like a lance and directed so as to receive the animal's charge. When driven to bay, the Indian Boar is as savage an animal as can be imagined, as with flashing eyes and foaming mouth he dashes first at one and then another of the horsemen, sometimes fairly driving them from the spot, and remaining master of the field.

ONE of the most formidable looking of Swine is the BABYROUSSA of Malacca.

This strange creature is notable for the curious manner in which the tusks are arranged, four of these weapons being seen to project above the snout. The tusks of the lower jaw project upward on each side of the upper, as is the case with the ordinary boar of Europe, but those of the upper jaw are directed in a very strange manner. Their sockets, instead of pointing downwards, are curved upwards, so that the tooth, in filling the curvatures of the socket, passes through a hole in the upper lip, and curls boldly over the face. The curve, as well as the comparative size of these weapons, is extremely variable, and is seldom precisely the same in any two individuals. The upper tusks do not seem to be employed as offensive weapons; indeed, in many instances they would be quite useless for such a purpose, as they are so strongly curved that their points nearly reach the skin of the forehead. The female is devoid of these curious appendages.

From all accounts the Babyroussa seems to be a very fierce and dangerous animal, being possessed of great strength, and able to inflict terrible wounds with the tusks of the lower jaw.

A naval officer who had experienced several encounters with this creature, spoke of it with great respect, and seemed to hold its warlike abilities in some awe. The adult male Babyroussa is considerably larger than the boar of England, and the officer above mentioned told me that he had seen them as large as donkeys. It is a very good swimmer, and will take to the water for its own gratification, swimming considerable distances without any apparent effort.

The skin of the Babyroussa is rather smooth, being sparsely covered with short bristly hairs. The object of the upper tusks is at present unknown, although certain old writers asserted that the animal was accustomed to suspend himself to branches by means of the appendage. The Babyroussa lives in herds of considerable size, and is found inhabiting the marshy parts of its native land.

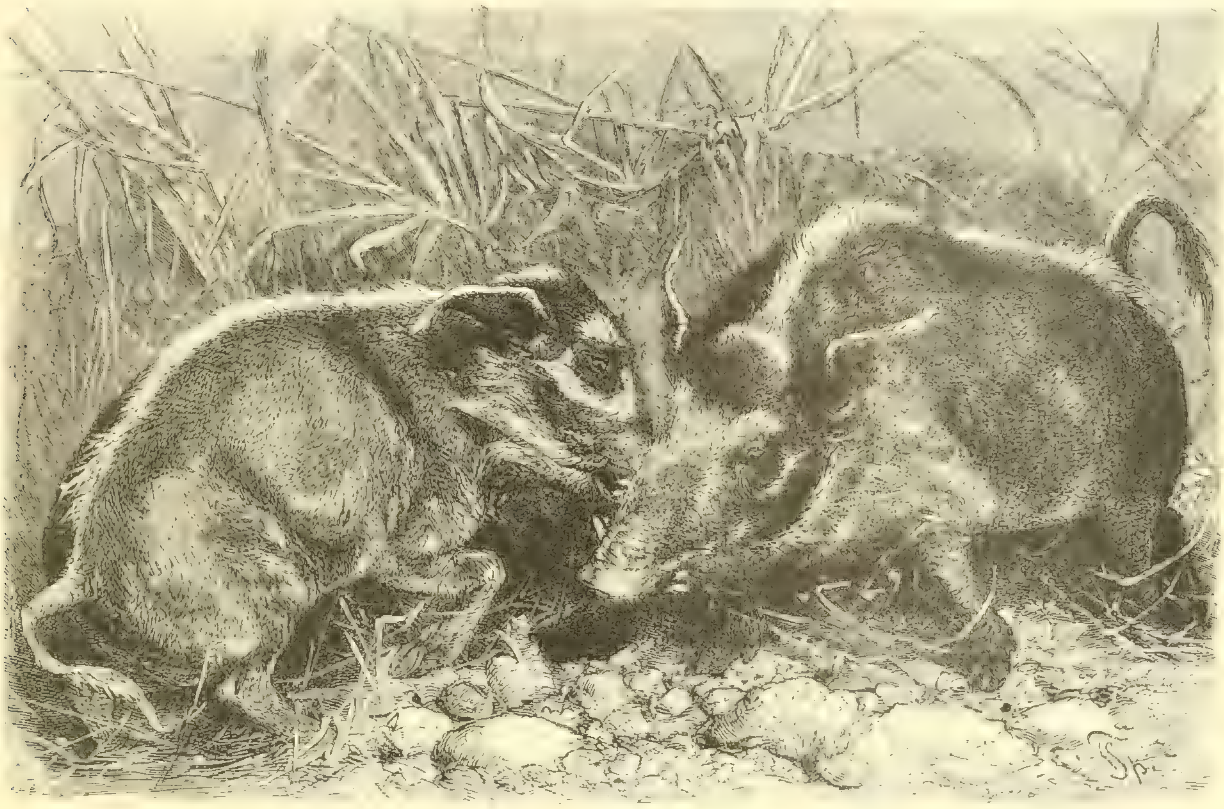
BABYROUSSA.—*Porcus babirussa.*

The Bosch Vark, or Bush Hog, of Southern Africa is a very formidable animal in aspect as well as in character, the heavy, lowering look, the projecting tusks, and the callous protuberance on the cheek, giving it a ferocious expression which is no way belied by the savage and sullen temper of the animal. The Bosch Vark inhabits the forests, and is generally found lying in excavations or hollows in the ground, from which it is apt to rush if suddenly disturbed, and to work dire vengeance upon its foe. In color it is extremely variable, some species being of a uniform dark brown, others of a brown variegated with white, while others are tinged with bright chestnut. The young is richly mottled with yellow and brown. For the following account of the habits of the Bosch Vark I am indebted to Captain Drayson's MS.

"Where the locality is sufficiently retired and wooded to afford shelter to the bush bucks which I have mentioned, we may generally expect to find traces of the Bush Pig. His spoor is like the letter M without the horizontal marks, the extremities of the toes forming two separate points, which is not the case with the antelopes, at least very rarely so, the general impression of their feet being like the letter A with a division down the centre, thus ⩚.

"The Bush Pig is about two feet six inches in height and five feet in length; his canine teeth are very large and strong, those in the upper jaw projecting horizontally, those in the lower upwards. He is covered with long bristles, and, taking him all in all, he is about as formidable-looking an animal, for his size, as can be seen.

"The Bosch Varks traverse the forests in herds, and subsist on roots and young shrubs. A large hard-shelled sort of orange, with an interior filled with seeds, grows in great quantities on the flats near the Natal forests; this is a favorite fruit of the wild pigs, and they will come out of the bush of an evening and roam over the plains in search of windfalls from these fruit-trees.



BOSCH VARK.—*Choiropotamus africanus.*

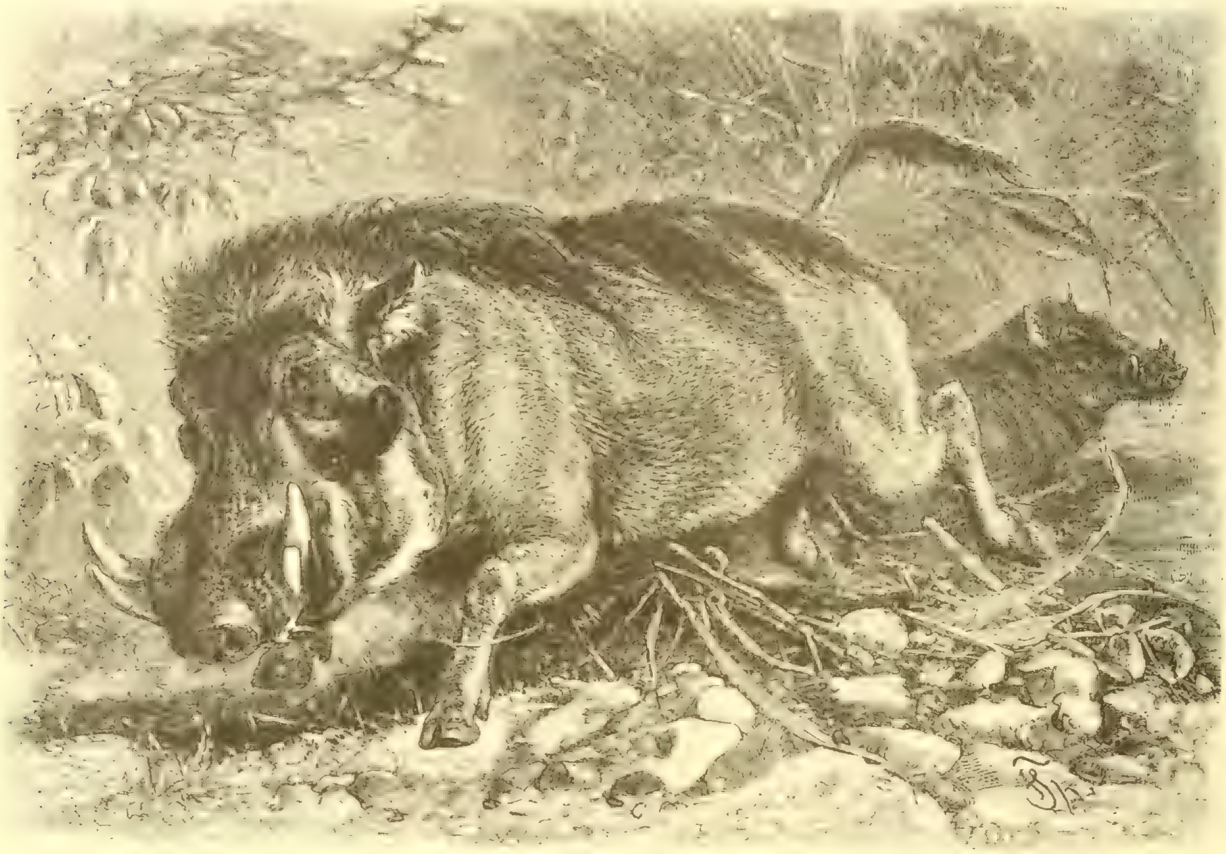
"The Kaffir tribes, although they refuse to eat the flesh of the domestic pig, will still feast without compunction on that of its bush brother.

"In the bush I always found the Kaffirs disinclined to encounter a herd of these wild Swine, stating as their reason for doing so that the animals were very dangerous; they also said that the wounds given by the tusks of this wild pig would not readily heal. The Berea bush of Natal was a favorite resort of these wild pigs, but although their spoor could be seen in all directions, the animals themselves were not so frequently encountered.

"The Kaffirs are much annoyed by these wild pigs, which force a passage through the imperfectly made fences, and root up the seeds, or destroy the pumpkins in the various gardens. As a defence, the Kaffirs leave nice enticing little openings in different parts of their fences, and the pigs, taking advantage of these ready-made doorways, frequently walk through them, and are then engulfed in a deep pit in which is a pointed stake, and they are assagaied with great delight by the expecting Kaffirs, who are on the alert, and who hear the cries of distress from piggy himself.

"The tusks are considered great ornaments, and are arranged on a piece of string and worn round the neck."

THE VLACKE VARK, or EMGALLA, is even a more formidable animal in its aspect than the bosch vark. The general color of the Vlacke Vark is a blackish hue upon the crown of the head, the neck, and upper part of the back, and dull brown upon the remainder of the body, except upon the abdomen, where it fades into a grayer hue. The tusks of an adult male are most terrible weapons, projecting eight or nine inches beyond the lips, and with them it has been known to cut a dog nearly in two with a single stroke, or to sever the fleshy parts of a man's thigh. It is a savage and determined opponent, and its charge is greatly to be dreaded. When chased, it presents a most absurd appearance, for it is naturally anxious to learn how much it has gained upon its pursuers, and is yet unable to look round, on account of its short neck and the large excrescence on each side of the face. The animal is therefore obliged to lift its snout perpendicularly in the air so as to look over its own shoulder; and as it always carries its tail stiff and upright when running, it has a most ludicrous aspect.



VLACKE VARK.—*Phacochœrus africanus.*

This animal is not devoid of sagacity, as was proved by Gordon Cumming: "I selected the old boar for my prey, and immediately separated him from his comrades. After ten miles of sharp galloping, we commenced ascending a considerable acclivity, where I managed to close with him, and succeeded in turning his head towards my camp. He now reduced his pace to a trot, and regarded me with a most malicious eye, his mouth a mass of foam. He was entirely in my power, as I had only to spring from my horse and bowl him over. I felt certain of him, but resolved not to shoot as long as his course lay in the direction of my wagon. At length, surprised at the resolute manner in which he held for my camp, I headed him; when, to my astonishment, he did not in the slightest swerve from his course, but trotted along behind my horse like a dog following me. This at once aroused my suspicions, and I felt certain that the cunning old fellow was making for some retreat, so I resolved to dismount and finish him. Just, however, as I had come to this resolution, I suddenly found myself in a labyrinth of enormous holes, the haunt of the ant-bear. In front of one of them the wild boar pulled up, and charging stern foremost into it, disappeared from my disappointed eyes, and I saw him no more. I rode home for my men; and returning, we collected grass and bushes, and tried to smoke him out, but without success."

The structure of the teeth in this animal is very curious, and will repay examination. Another species, the Halluf, or Haroja (*Phacochœrus æliani*), belongs to the same genus. This animal is sometimes known as the Ethiopian Wild Boar, or the Abyssinian Phacochœre.

America possesses a representative of the porcine group in the Peccaries, two species of which animals inhabit the Brazils.

The common Peccary, or Tajaçu, although it is of no very great dimensions, resembling a small pig in size, is yet as terrible an animal as the Wild Boar of India or the Phacochœre of Africa. Ever fierce and irritable of temper, the Peccary is as formidable an antagonist as can be seen in any land, for it knows no fear, and will attack any foe without hesitation. Fear is a feeling of which the Peccary is ignorant, probably because its intellect is not of a very high order, and it is unable to comprehend danger. Although the Peccary is a very harmless animal to outward view, being only three feet long and weighing fifty or sixty pounds, and its armature consists of some short tusks that are barely seen beyond the lips, yet these little tusks are as fearful weapons as the eight-inch teeth of the vlacke vark, for they are shaped like a lancet, being acutely pointed and double edged, so that they cut like knives and inflict very terrible wounds.

PECCARY.—*Dicótyles torquátus.*

No animal seems to be capable of withstanding the united attacks of the Peccary, even the jaguar being forced to abandon the contest, and to shrink from encountering the circular mass of Peccaries as they stand with angry eyes and gnashing teeth ready to do their worst on the foe. In Webber's Romance of Natural History there is a very amusing account, too long to be quoted in this place, of the sudden consternation that was caused during a bear hunt by the charge of a herd of Peccaries, which came rushing over the very spot where the deadly struggle was being waged, scattering men, dogs, and bear in a common confusion. The singular courage of this animal seems, however, to be based on ignorance, for after a herd of Peccaries have been frequently assailed by the hunter, they appear to learn the power of their adversaries, and instead of charging at their opponents, make the best of their way to some place of concealment.

The usual resting-place of the Peccary is in the hollow of a fallen tree, or in some burrow that has been dug by an armadillo and forsaken by the original inhabitant. The hollow tree, however, is the favorite resort, and into one of these curious habitations a party of Peccaries will retreat, each backing into the aperture as far as he can penetrate the trunk, until the entire hollow is filled with the odd little creatures. The one who last enters becomes the sentinel, and keeps a sharp watch on the neighborhood. The native hunters take advantage of this curious habit to immolate great numbers of these animals. There are two methods of Peccary killing, one by the gun and the other by the sword and pitchfork.

In the former method the hunter takes up his temporary abode in some concealed spot that commands the entrance of the tree or hole in which the Peccaries are known to sleep. As soon as the sentinel has assumed its post, the hunter takes a careful aim at the forehead, and kills it with a single ball. The wounded animal cautiously leaps from the cover, and its place is immediately taken by its successor. The hunter instantly reloads his rifle, and kills the second Peccary in like manner. In this way he will kill the entire family without giving the alarm. If the slain animal should not leap from the hollow, but fall dead at its post, the carcase is pushed out of the hole by the next in succession, who then assumes the part of sentinel without displaying any alarm. The other method requires the co-operation of two hunters, and is managed by one getting above the mouth of the hole and pinning the foremost Peccary to the ground with a pitchfork, while the other despatches it with a sword.

The food of the common Peccary is of a very varied character, and consists of fruits, seeds, grain, roots, reptiles, small birds and their eggs, and, indeed, of almost anything vegetable or animal which can be swallowed. The flesh of the Peccary is not of much value, as during many parts of the year it is wholly uneatable, on account of an odoriferous gland in the back, which taints the meat to such an extent that it cannot be eaten. The flesh of the male is at all times very unpleasant, but that of the female is in some months tolerably good, and has been compared to that of the hare. At the best, however, it is dry and insipid, as there is no fat or lard to be found in the Peccary. In all cases, the gland must be removed as soon as the animal is dead, for if it be permitted to remain but for a single hour, its effects will be perceptible throughout the entire body.

The common Peccary is not so harmful to the agriculturist as its large relation, and as it destroys such large number of reptiles, is probably rather beneficial than otherwise. The color of the Peccary is a grizzled brown, with the exception of a white stripe that is drawn over the neck, and has earned for the animal the name of the Collared Peccary.

THE TAGNICATE, OR WHITE-LIPPED PECCARY, is larger than the preceding animal, assembles in larger herds, is fiercer in its disposition, and works more woe to the farmer.

The White-lipped Peccary derives its name from a band of white hairs that crosses the upper jaw, and covers nearly the whole of the lower. The color of the adult animal is black-brown, flecked with a gray grizzle, but when young it is striped after the manner of the bosch-vark. A slight mane runs along its neck, and its ears are fringed with long and stiff hairs. It is a most mischievous animal, as it makes long marches over the country, ravaging the crops in its progress, and always choosing, with a perversely excellent taste, the best maize and grass. The cry of the Peccary is a sharp shrill grunt. When angry, the Peccary clashes its teeth smartly together, producing a sound which is recognizable at some distance, and is very useful to the hunters, as it serves to give timely notice of the animal's approach.

The generic name, Dicotyles, signifies "double-cupped," and is given to the animal on account of the peculiar open gland upon the back. This species is a good swimmer, and often crosses rivers of its own accord. As, however, it loses all its offensive powers while in the water, the Indians watch the opportunity, and by dashing among the floating animals, kill as many as they choose without any danger.

FAMILY SUIDÆ, the Hogs, has five genera and twenty-two species. The Peccaries are the only ones inhabiting this Continent. Two species are recognized.

THE RHINOCEROS.

Several species of the Rhinoceros are still inhabitants of the north, and several others have long been extinct, and can only be recognized by means of their fossilized remains. Of the existing species, two or three are found in various parts of Asia and its islands, and the remainder inhabit several portions of Africa. Before examining the separate species, we will glance at some of the characteristics which are common to all the members of this very conspicuous group.

The so-called horn which projects from the nose of the Rhinoceros is a very remarkable structure, and worthy of a brief notice. It is in no way connected with the skull, but is simply a growth from the skin, and may take rank with hairs, spines, or quills, being indeed formed after a similar manner. If a Rhinoceros horn be examined—the species of its owner is quite immaterial—it will be seen to be polished and smooth at the tip, but rough and split into numerous filaments at the base. These filaments, which have a very close resemblance to those which terminate the plates of whalebone, can be stripped upwards for some length, and if the substance of the horn be cut across, it will be seen to be composed of a vast number of hairy filaments lying side by side, which, when submitted to the microscope, and illuminated by polarized light, glow with all the colors of the rainbow, and bear a strong resemblance to transverse sections of actual hair. At the birth of the young animal, the horn is hardly visible, and its full growth is the work of years.

As the horn is employed as a weapon of offence, and is subjected to violent concussions, it is set upon the head in such a manner as to save the brain from the injurious effects which might result from its use in attack or combat. In the first place, the horn has no direct connection with the skull, as it is simply set upon the skin, and can be removed by passing a sharp knife round its base, and separating it from the hide on which it grows. In the second place, the bones of the face are curiously developed, so as to form an arch with one end free, the horn being placed upon the crown of the bony arch, so as to diminish the force of the concussion in the best imaginable manner. The substance of the horn is very dense, and even when it is quite dry, it possesses very great weight in proportion to its size. In former days, it was supposed to bear an antipathy to poison, and to cause effervescence whenever liquid poison was poured upon it. Goblets were therefore cut from this material, and when gorgeously mounted in gold and precious stones, were employed by Eastern monarchs as a ready means for detecting any attempt to administer a deadly drug.

The skin of the Rhinoceros is of very great thickness and strength, bidding defiance to ordinary bullets, and forcing the hunter to provide himself with balls which have been hardened with tin or solder. The extreme strength of the skin is well known both to the Asiatic and African natives, who manufacture it into shields and set a high value on these weapons of defence.

All the species of Rhinoceros are very tetchy in their temper, and liable to flash out into anger without any provocation whatever. During these fits of rage, they are dangerous neighbors, and are apt to attack any moving object that may be within their reach. In one well-known instance, where a Rhinoceros made a sudden dash upon a number of picketed horses, and killed many of them by the strokes of his horn, the animal had probably been irritated by some unknown cause, and wreaked his vengeance on the nearest victims. During the season of love, the male Rhinoceros is always vicious, and, like the elephant, the buffalo, and other animals in the like condition, will conceal himself in some thicket, and from thence dash out upon any moving object that may approach his retreat.

Sometimes the Rhinoceros will commence a series of most extraordinary antics, and seeming to have a spite towards some particular bush, will rip it with his horn, trample it with his feet, roaring and grunting all the while, and will never cease until he has cut it into shreds and levelled it with the ground. He will also push the point of his horn into the earth, and career along, ploughing up the ground as if a furrow had been cut by some agricultural implement. In such case it seems that the animal is not laboring under a fit of rage, as might be supposed, but is merely exulting in his strength, and giving vent to the exuberance of health by violent physical exertion.

The Rhinoceros is a good aquatic, and will voluntarily swim for considerable distances. It is very fond of haunting the river-banks and wallowing in the mud, so as to case itself with a thick coat of that substance, in order to shield itself from the mosquitoes and other mordant insects which cluster about the tender places, and drive the animal, thick-skinned though it may be, half mad with their constant and painful bites. In Sumatra, a curious result sometimes follows from this habit of mud-wallowing, as may be seen from the following extract from the "Journal of the Indian Archipelago." "This animal, which is of solitary habits, is found frequently in marshy places with its whole body immersed in the mud, and part of the head only visible. The Malays call the animal 'Badak-Tapa,' or the recluse Rhinoceros. Towards the close of the rainy season they are said to bury themselves in this manner in different places; and upon the dry weather setting in, and from the powerful effects of a vertical sun, the mud becomes hard and crusted, and the Rhinoceros cannot effect its escape without considerable difficulty and exertion. The Semangs prepare themselves with large quantities of combustible materials, with which they quietly approach the animal, who is aroused from his reverie by an immense fire over him, which, being kept well supplied by the Semangs with fresh fuel, soon completes his destruction, and renders him in a fit state to make a meal of."

In every species of Rhinoceros the sight appears to be rather imperfect, the animal being unable to see objects which are exactly in its front. The scent and hearing, however, are very acute, and seem to warn the animal of the approach of danger.

The Asiatic species of Rhinoceros are remarkable for the heavy folds into which the skin is gathered, and which hang massively over the shoulders, throat, flanks, and hind quarters. Upon the abdomen the skin is comparatively soft, and can be pierced by a spear which would be harmlessly repelled from the thick folds of hide upon the upper portions of the body. In the INDIAN RHINOCEROS this weight of hide is especially conspicuous, the skin forming great flaps that can be easily lifted up by the hand. In a tamed state the Rhinoceros is pleased to be caressed on the softer skin under the thick hide, and in the wild state it suffers sadly from the parasitic insects that creep beneath the flaps, and lead the poor animal a miserable life, until they are stifled in the muddy compost with which the Rhinoceros loves to envelop its body. The horn of the Indian species is large in width, but inconsiderable in height, being often scarcely higher than its diameter. Yet with this short, heavy weapon, the animal can do terrible execution, and is said, upon the authority of Captain Williamson, to repel the attack of an adult male elephant.

The height of this animal when full-grown is rather more than five feet, but the average height seems scarcely to exceed four feet. In color it is a deep brown-black, tinged with a purple hue, which is most perceptible when the animal has recently left its bath. The color of the young animal is much paler than that of the mother, and partakes of a pinky hue.

THE JAVANESE RHINOCEROS is not so large as its Indian relation, the skin-folds are much less conspicuous, and are arranged in a different manner. The hide, too, is covered with certain angular markings, interspersed with short hairs, and its limbs are proportionately longer and more slender. It is a nocturnal animal, seldom being seen by day, and issuing at night from its place of concealment for the purpose of feeding. Being a large and powerful beast, and happening to be very fond of several cultivated plants, such as the coffee and the pepper vine, it is apt to burst its way into the plantations, and to do considerable damage before it retires to its forest home. It seems to be more gentle and tractable than the common Indian Rhinoceros, and has been trained to wear a saddle, and to be guided by a rider.

The Sumatran species possesses two horns upon its nose, the first being tolerably long and sharp, and the second very thick, short, and pyramidal. The skin-folds are very slight in this animal; the hide is black in color, rough in texture, and is covered with a thin crop of short bristly hairs. The neck is short and heavy, and the limbs are more clumsy than those of the Indian species. From all accounts it seems to be a very quiet creature, and to be held in no

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RHINOCEROS.

kind of dread, as an adult male has been seen to fly in terror before the attack of one of the native wild dogs. The head of this species is peculiarly long, a characteristic which is observable in the skull as well as in the living animal.

Of African Rhinoceroses four species are clearly ascertained, and it is very probable that others may yet be in existence. Two of the known species are black, and the other two white; the animals differing from each other not only in color, but in form, dimensions, habits, and disposition. The commonest of the African species is the Borele, Rhinaster, or Little Black Rhinoceros, of Southern Africa; an animal which may be easily distinguished from its relations by the shape of the horns and the upper lip. In the Borele the foremost horn is of considerable length, and bent rather backward, while the second horn is short, conical, and much resembles the weapon of the Indian animal. The head is rather rounded, and the pointed upper lip overlaps the lower, and is capable of considerable extension.

The Borele is a very fierce and dangerous animal, and is more feared by the natives than even the lion. Although so clumsy in shape and aspect, it is really a quick and active creature, darting about with lightning speed, and testing the powers of a good horse to escape from its charge. Like many other wild animals, it becomes furiously savage when wounded, but it will sometimes attack a passenger without the least provocation. On one occasion an angry Rhinoceros came charging down upon a wagon, and struck his horn into the bottom plank with such force as to send the wagon forward for several paces, although it was sticking in deep sand. He then left the wagon, and directed his attack upon the fire, knocking the burning wood in every direction, and upsetting the pot which had been placed on the fire. He then continued his wild career in spite of the attempts of a native who flung his spear at him, but without the least effect, as the iron point bent against the strong hide.

The skin of this animal does not fall in heavy folds, like that of the Asiatic species, but is nevertheless extremely thick and hard, and will resist an ordinary leaden bullet, unless it be fired from a small distance. The skin is employed largely in the manufacture of whips, or jamboks, and is prepared in a rather curious manner. When the hide is removed from the animal it is cut into strips of suitable breadth and laid on the ground. These strips are then hammered for some time in order to condense the substance of the skin, and when they are dry are carefully rounded with a knife and polished with sand-paper. One of these whips will continue serviceable for several years. The horn of the Borele, from its comparatively small dimensions, is not so valuable as that of the other species, but is still employed in the manufacture of drinking-cups and sword-handles. Its value is about half that of ivory.

The food of the Black Rhinoceros, whether the Borele or the keitloa, is composed of roots, which the animal ploughs out of the ground with its horn, and of the young branches and shoots of the wait-a-bit thorn. It is rather remarkable that the black species is poisoned by one of the Euphorbiaceæ, which is eaten with impunity by the two white animals.

When wounded, the Black Rhinoceros is a truly fearful opponent, and it is generally considered very unsafe to fire at the animal unless the hunter is mounted on a good horse or provided with an accessible place of refuge. An old experienced hunter said that he would rather face fifty lions than one wounded Borele; but Mr. Oswell, the well-known African sportsman, always preferred to shoot the Rhinoceros on foot. The best place to aim is just behind the shoulder, as, if the lungs are wounded, the animal very soon dies. There is but little blood externally, as the thick loose skin covers the bullet-hole, and prevents any outward effusion. When mortally wounded the Rhinoceros generally drops on its knees.

It is at all times a rather savage beast, and is apt to quarrel with its own kind. Mr. Andersson mentions a curious battle of which he was an eye-witness, where four of these animals engaged furiously with each other. Two of them he contrived to shoot, and found that one was absolutely unfit for food, being covered with festering wounds which had been received in former encounters. The flesh of this animal is tolerably good, but that of the black species is rather tough, and possesses a bitter and unpleasant flavor, in consequence of the food on which the animal lives. The white species feeds almost exclusively on grass, and its flesh is remarkably good and tender. The Borele is a nocturnal animal, rousing himself from sleep at dark, and proceeding straightway to the nearest pool. Having refreshed himself, he takes long journeys in search of food, and returns to his temporary home soon after sunrise. When sleeping, he lies so still that he may easily be mistaken for a fragment of dark rock.

As the eyes are set deeply in the head of the Rhinoceros, it is unable to see objects directly in its front if they are at any distance, its sight being hindered by the horns. But the hearing and scent of the creature are marvellously acute, and so wary is the animal, that even when feeding it will constantly halt, raise its ears, snuff the wind, and will not return to its occupation until its fears have been allayed.

THE KEITLOA can readily be recognized by the horns, which are of considerable length, and nearly equal to each other in measurement. This is always a morose and ill-tempered animal, and is even more to be dreaded than the borele, on account of its greater size, strength, and length of horn. The upper lip of the Keitloa overlaps the lower even more than that of the borele; the neck is longer in proportion, and the head is not so thickly covered with wrinkles. At its birth the horns of this animal are only indicated by a prominence on the nose, and at the age of two years the horn is hardly more than an inch in length. At six years of age it is nine or ten inches long, and does not reach its full measurement until the lapse of considerable time.

The Keitloa is a terribly dangerous opponent, and its charge is so wonderfully swift, that it can hardly be avoided. One of these animals that had been wounded by Mr. Andersson, charged suddenly upon him, knocked him down, fortunately missing her stroke with her horns, and went fairly over him, leaving him to struggle out from between her hind legs. Scarcely had she passed than she turned, and made a second charge, cutting his leg from the knee to the hip with her horn, and knocking him over with a blow on the shoulder from her fore-feet. She might easily have completed her revenge by killing him on the spot, but she then left him, and plunging into a neighboring thicket, began to plunge about and snort, permitting her victim to make his escape. In the course of the day the same beast attacked a half-caste boy who was in attendance on Mr. Andersson, and would probably have killed him had she not been intercepted by the hunter, who came to the rescue with his gun. After receiving several bullets, the Rhinoceros fell to the ground, and Mr. Andersson walked up to her, put the muzzle of the rifle to her ear, and was just about to pull the trigger, when she again leaped to her feet. He hastily fired and rushed away, pursued by the infuriated animal, which, however, fell dead just as he threw himself into a bush for safety. The race was such a close one, that as he lay in the bush he could touch the dead Rhinoceros with his rifle, so that another moment would probably have been fatal to him.

THE common WHITE RHINOCEROS (*Rhinoceros simus*) is considerably larger than the two preceding animals, and together with the kobaoba, or long-horned white Rhinoceros, is remarkable for its square muzzle and elongated head. The foremost horn of this animal is of very considerable length, attaining a measurement of more than three feet when fully grown. The second horn is short and conical, like that of the borele. Fortunately for the human inhabitants of the regions where the White Rhinoceros dwells, its temper is remarkably quiet, and devoid of that restless irritability and sudden access of rage which is so distinguishing a quality of the two black species. Even when wounded it seldom turns upon its antagonist, but contents itself with endeavoring to make its escape. Sometimes, however, probably when it has its young to protect, it will assume the offensive, and is then even more to be dreaded than its black relatives. The following anecdote, which was related by Mr. Oswell, the hero of the tale, to Mr. Andersson, affords an instance of this rare display of combativeness:—

"Once as I was returning from an elephant chase, I observed a huge White Rhinoceros a short distance ahead. I was riding a most excellent hunter—the best and fleetest steed that I ever possessed during my shooting excursions in Africa—at the time; but it was a rule with me never to pursue a Rhinoceros on horseback, and simply because this animal is so much more easily approached and killed on foot. On this occasion, however, it seemed as if fate had interfered.

"Turning to my after-rider, I called out: 'By heaven! that fellow has got a fine horn! I will have a shot at him.' With that, I clapped spurs to my horse, who soon brought me alongside the huge beast, and the next instant I lodged a ball in his body, but, as it turned out, not with deadly effect. On receiving my shot, the Rhinoceros, to my great surprise, instead of seeking safety in flight, as is the habit of this generally inoffensive animal, suddenly stopped short, then turned sharply round, and having eyed me most curiously for a second or two, walked slowly towards me. I never dreamt of danger. Nevertheless, I instinctively turned my horse's head away: but, strange to say, this creature, ususally so docile and gentle—which the slightest touch of the reins would be sufficient to guide—now absolutely refused to give me his head. When at last he did so, it was too late; for, notwithstanding the Rhinoceros had only been walking, the distance between us was so inconsiderable, that by this time I clearly saw contact was unavoidable. Indeed, in another moment I observed the brute bend low his head, and, with a thrust upwards, strike his horn into the ribs of the horse with such force as to penetrate to the very saddle on the opposite side, where I felt its sharp point against my leg.

"The violence of the blow was so tremendous as to cause the horse to make a complete somersault in the air, coming heavily down on its back. With regard to myself, I was, as a matter of course, violently precipitated to the ground. Whilst thus prostrated, I actually saw the horn of the infuriated beast alongside of me; but, seemingly satisfied with his revenge, without attempting to do farther mischief, he started off at a canter from the scene of action. My after-rider having by this time come up, I rushed upon him, and almost pulling him off his horse, leapt into the saddle; and, without a hat, and my face streaming with blood, was quickly in pursuit of the retreating beast, which I soon had the satisfaction to see stretched lifeless at my feet."

THE flesh of the MUCHUCO, or MONOOHOO, as the White Rhinoceros is called by the natives, is apt to be rather tough, but is of good flavor. The best portions are those which are cut from the upper part of the shoulder and from the ribs, where the fat and the lean parts are regularly striped to the depth of two inches. If a large portion of the meat is to be cooked at one time, the flesh is generally baked in the cavity of a forsaken ant-hill, which is converted into an extempore oven for the occasion; but if a single hunter should need only to assuage his own hunger, he cuts a series of slices from the ribs, and dresses them at his fire. The hide of the Monoohoo is enormously thick, and gives a novice no little trouble to get it from the body, as it is as hard as a board, and nearly as stiff. An adept, however, will skin the animal as quickly and easily as if it were a sheep.

The KOBAOBA, or Long-horned White Rhinoceros (*Rhinoceros oswellii*) is much rarer than either of the preceding species, and is found far in the interior, mostly to the east of the Limpopo River. The peculiar manner in which this species carries its horns, makes it a very conspicuous animal. In all the other species, the horns are curved, and incline rather backward; but in the Kobaoba, the foremost horn is nearly straight, and projects forward, so that when the animal is running, the tip of the horn nearly touches the ground. Indeed, the extremity of an adult Kobaoba's horn is generally rubbed down on one side, owing to the frequency with which it has come in contact with the earth. The head of this and the preceding species is always carried very low, forming a singular contrast to the saucy and independent manner in which the borele carries his head.

The long horn of the Kobaoba sometimes exceeds four feet in length, and as it is almost straight, is most valuable for many purposes. The best, toughest, and straightest ramrods are manufactured from this horn, and I have seen one of these ramrods that was almost four feet long, even after being shaped and trimmed, so that the horn from which it was cut must have been still longer. The mother Kobaoba employs this horn for a very curious purpose, as was seen by Cumming. Whenever the mother and her young are abroad, the calf always takes the lead, and in this instance she guided her little one by pressing it against the calf's side.

The horn is also used by the Kaffirs to make "knobherries," or knob-headed sticks, which they can employ as clubs in hand-to-hand combat, or can throw with wonderful effect. A party of Kaffirs will often go out in chase of birds, armed with nothing but these knobherries, which they will hurl with such force and precision that they generally return home loaded with game.

The four African species of Rhinoceros are not at all prolific animals, producing only one young one at a time, and, as far as is known, a considerable interval occurs between births. It is not a gregarious, neither does it appear to be a monogamous, animal. It seems, however, to find some gratification in the presence of others of its own species, and may be seen in little assemblies of eight or ten in number. These assemblies, however, cannot be termed flocks or herds, as their members are not under the command of a single leader, nor bound together by any common tie, and, when alarmed, each individual makes his escape as best he can. The skin is comparatively smooth, and devoid of hair, so that the animal bears some resemblance to an overgrown pig.

One of the most curious little animals in existence is the Hyrax, interesting not so much from its imposing external appearance, as for its importance in filling up a link in the chain of creation.

HYRAX, OR ROCK RABBIT. *Hyrax habessinicus.*

About as large as a tolerably sized rabbit, covered with thick, soft fur, inhabiting holes in the banks, possessing incisor-like teeth, and, in fine, being a very rabbit in habits, manners, and appearance, it was long classed among the rodents, and placed among the rabbits and hares. It has, however, been discovered in later years, that this little rabbit-like animal is no rodent at all, but is of one of the pachydermata, and that it forms a natural transition from the rhinoceros to the hippopotamus. On a close examination of the teeth, they are seen to be wonderfully like those of the hippopotamus, their edges being bevelled off in a similar manner, and therefore bearing some resemblance to the chisel-edged incisors of the rodents. There are several species of Hyrax, one of which inhabits Northern Africa and Syria, while the other two are found in Abyssinia and South Africa.

The South African Hyrax is termed by the colonists Klip Das, or Rock Rabbit, and is found in considerable plenty among the mountainous districts of its native land, being especially common on the sides of the Table mountain. It is largely eaten by the natives, who succeed in killing it in spite of its extreme wariness and activity. Among the crevices and fissures in the rock the Hyrax takes up its abode, and may often be seen sitting in the warm rays of the sun, or feeding with apparent carelessness on the aromatic herbage of the mountain side. It is, however, perfectly secure, in spite of its apparent negligence, for a sentinel is always on guard, ready to warn his companions by a peculiar shrill cry of the approach of danger. Sometimes the Hyrax is seen at a considerable height, but is often observed near the sea-shore, seated on rocks which are barely above high-water mark.

Besides mankind, the Hyrax has many foes, such as the birds of prey and carnivorous quadrupeds, and is destroyed in considerable numbers. The fore-feet of this animal are apparently furnished with claws like those of the rabbit, but on a closer inspection, the supposed claws are seen to be veritable hoofs, black in color, and very similar to those of the rhinoceros in form. The Hyrax is an agile little creature, and can climb a rugged tree-trunk with great ease. It is rather hot in its temper, and if irritated, becomes highly excited, and moves its teeth and feet with remarkable activity and force.

The Syrian Hyrax is the animal which is mentioned under the name of "coney" in the Old Testament, and is found inhabiting the clefts and caverns of rocks. In its habits and general appearance it is very similar to the Cape Hyrax, and needs no farther description. Although it will bite fiercely when first captured, it is sufficiently docile in disposition, and soon learns to obey its keeper, towards whom it displays an affectionate disposition if it be rightly treated. The color of both species is dark brown, but the Syrian animal can be distinguished from the Cape Hyrax by the presence of a great number of very long black hairs, which are thickly scattered over its body, and penetrate through the shorter fur. Its native name is Ashkoko.

THE HIPPOPOTAMUS.

The last on the list of the pachydermatous animals is the well-known Hippopotamus, or River Horse.

This enormous quadruped is a native of various parts of Africa, and is always found either in water or in its near vicinity. In absolute height it is not very remarkable, as its legs are extremely short, but the actual bulk of its body is very great indeed. The average height of a full-grown Hippopotamus is about five feet. Its naked skin is dark brown, curiously marked with innumerable lines like those on "crackle" china or old oil-paintings, and is also dappled with a number of sooty black spots, which cannot be seen except on a close inspection. A vast number of pores penetrate the skin, and exude a thick, oily liquid, which effectually seems to protect the animal from the injurious effects of the water in which it is so constantly immersed. The author once spoiled a pair of gloves entirely by patting the male animal at present in the Zoological Gardens. The mouth is enormous, and its size is greatly increased by the odd manner in which the jaw is set in the head.

Within the mouth is an array of white, gleaming tusks, which have a terrific appearance, but are solely intended for cutting grass and other vegetable substances, and are seldom employed as weapons of offence, except when the animal is wounded or otherwise irritated. The incisor teeth of the lower jaw lie almost horizontally, with their points directed forwards, and are said to be employed as crowbars in tearing up the various aquatic plants on which the animal feeds. The canines are very large and curved, and are worn obliquely, in a manner very similar to the rodent type of teeth. Their shape is a bold curve, forming nearly the half of a circle, and their surface is deeply channeled and ridged on the outer line of the curve, and smoother on the face. The entire tooth, when it has been removed from the animal and thoroughly dried, is covered with a series of fine, superficial cracks, which intersect each other diagonally with much regularity, being a veritable example of nature's "cross-hatching."

The tooth is very solid in its substance and close in its grain, and as it retains its color under very trying circumstances, is admirably adapted for the manufacture of artificial teeth. Throughout the greater part of its length it is quite solid, but bears a conical hollow about three or four inches deep at the extremity which enters the socket. The extreme whiteness of the ivory obtained from the Hippopotamus' teeth renders it peculiarly valuable for the delicate scales of various philosophical instruments, and its natural curve adapts it admirably for the verniers of ship sextants. The weight of a large tooth is from five to eight pounds, and the value of the ivory is from four to five dollars per pound.

With these apparently combined teeth the Hippopotamus can cut the grass as neatly as if it were mown with a scythe, and is able to sever, as if with shears, a tolerably stout and thick stem.

Possessed of an enormous appetite, having a stomach that is capable of containing five or six bushels of nutriment, and furnished with such powerful instruments, the Hippopotamus is a terrible nuisance to the owners of cultivated lands that happen to be near the river in which the animal has taken up his abode. During the day it is comfortably asleep in its chosen hiding-place, but as soon as the shades of night deepen, the Hippopotamus issues from its den, and treading its way into the cultivated lands, makes sad devastation among the growing crops. Were the mischief to be confined to the amount which is eaten by the voracious brute, it would still be bad enough, but the worst of the matter is, that the Hippopotamus damages more than it eats by the clumsy manner of its progress. The body is so large and heavy, and the legs are so short, that the animal is forced to make a double track as he walks, and in the grass-grown plain can be readily traced by the peculiar character of the track. It may therefore be easily imagined that when a number of these hungry, awkward, waddling, splay-footed beasts come blundering among the standing crops, trampling and devouring indiscriminately, they will do no slight damage before they think fit to retire.

The aggrieved cultivators endeavor to protect their grounds and at the same time to make the depredators pay for the damage which they have done, by digging a number of pitfalls across the Hippopotamus paths, and furnishing each pit with a sharp stake in the centre.

When an animal falls into such a trap, the rejoicings are great, for not only is the ivory of great commercial value, but the flesh is very good eating, and the hide is useful for the manufacture of whips and other instruments. The fat of the Hippopotamus, called by the colonists "Zee-Koe speck," or Sea-cow bacon, is held in very high estimation, as is the tongue and the jelly which is extracted from the feet. The hide is so thick that it must be dragged from the creature's body in slips, like so many planks, and is an inch and a half in thickness on the back, and three-quarters of an inch on the other portions of the body. Yet, in spite of its enormous thickness and its tough quality, it is quite pliable when seen on the living beast, and accommodates itself easily to all his movements.

The Hippopotamus is, as the import of its name, River Horse, implies, most aquatic in its habits. It generally prefers fresh water, but it is not at all averse to the sea, and will sometimes prefer salt water to fresh. It is an admirable swimmer and diver, and is able to remain below the surface for a very considerable length of time. In common with the elephant, it possesses the power of sinking at will, which is the more extraordinary when the huge size of the animal is taken into consideration. Perhaps it may be enabled to contract itself by an exertion of the muscles whenever it desires to sink, and to return to its former dimensions when it wishes to return to the surface. It mostly affects the stillest reaches of the river, as it is less exposed to the current, and not so liable to be swept down the stream while asleep. The young Hippopotamus is not able to bear submersion so long as its parent, and is therefore carefully brought to the surface at short intervals for the purpose of breathing. During the first few months of the little animal's life, it takes its stand on its mother's neck, and is borne by her above or through the water as experience may dictate or necessity require.

There are various modes of hunting this mischievous but valuable animal, each of which is in vogue in its own particular region. The pitfalls above mentioned are universal throughout the whole Hippopotamus country, and lure many an animal to its destruction without needing any care or superintendence on the part of the men who set the snare. There is also the "down-fall," a trap which consists of a log of wood, weighted heavily at one end, to which extremity is loosely fixed a spear-head well treated with poison. This terrible log is suspended over some Hippopotamus path, and is kept in its place by a slight cord which crosses the path and is connected with a catch or trigger. As soon as the animal presses the cord, the catch is liberated, and down comes the armed log, striking the poisoned spear deep into the poor beast's back, and speedily killing it by the poison, if not from the immediate effects of the wound.

The white hunter of course employs his rifle and finds that the huge animal affords no easy mark, as unless it is hit in a mortal spot it dives below the surface and makes good its escape. Mortal spots, moreover, are not easy to find, or when found, to hit; for the animal soon gets cunning after it has been alarmed, and remains deeply immersed in the water as long as it is able, and when it at last comes to the surface to breathe, it only just pushes its nostrils above

HIPPOPOTAMUS.

the surface, takes in the required amount of air, and sinks back again to the river bed. Moreover, it will often be so extremely wary, that it will not protrude even its mouth in the open water, and looks out for some reeds or floating substances which may cover its movements while breathing. As a general rule, it is found that the most deadly wound that can be given to a Hippopotamus is on the nose, for the animal is then unable to remain below the surface, and consequently presents an easy mark to the hunter. A heavy ball just below the shoulder always gives a mortal wound, and in default of such a mark being presented, the eye or the ear is a good place to aim at.

The most exciting manner of hunting the Hippopotamus is by fairly chasing and harpooning it, as if it were a whale or a walrus. This mode of sport is described very vividly by Mr. Andersson.

The harpoon is a very ingenious instrument, being composed of two portions, a shaft measuring three or four inches in thickness and ten or twelve feet in length, and a barbed iron point, which fits loosely into a socket in the head of the shaft, and is connected with it by means of a rope composed of a number of separate strands. This peculiar rope is employed to prevent the animal from severing it, which he would soon manage were it to be composed of a single strand. To the other end of the shaft a strong line is fastened, and to the other end of the line a float or buoy is attached. As this composite harpoon is very weighty it is not thrown at the animal, but is urged by the force of the harpooner's arm. The manner of employing it shall be told in Mr. Andersson's own words:

"As soon as the position of the Hippopotami is ascertained, one or more of the most skilful and intrepid of the hunters stand prepared with the harpoons; whilst the rest make ready to launch the canoes, should the attack prove successful. The bustle and noise caused by these preparations gradually subside. Conversation is carried on in a whisper, and every one is on the *qui-vive.* The snorting and plunging become every moment more distinct; but a bend in the stream still hides the animals from view. The angle being passed, several dark objects are seen floating listlessly on the water, looking more like the crests of sunken rocks than living creatures. Ever and anon, one or other of the shapeless masses is submerged, but soon again makes its appearance on the surface. On, on, glides the raft with its sable crew, who are now worked up to the highest state of excitement. At last, the raft is in the midst of the herd, who appear quite unconscious of danger. Presently one of the animals is in immediate contact with the raft. Now is the critical moment. The foremost harpooner raises himself to his full height, to give the greater force to the blow, and the next instant the fatal iron descends with unerring accuracy in the body of the Hippopotamus.

"The wounded animal plunges violently, and dives to the bottom; but all his efforts to escape are unavailing. The line or the shaft of the harpoon may break; but the cruel barb once imbedded in the flesh, the weapon (owing to the toughness and thickness of the beast's hide) cannot be withdrawn.

"As soon as the Hippopotamus is struck, one or more of the men launch a canoe from off the raft, and hasten to the shore with the harpoon-line, and take a round turn with it about a tree, or bunch of reeds, so that the animal may either be 'brought up' at once, or, should there be too great a strain on the line, 'played' (to liken small things to great) in the same manner as the salmon by the fishermen. But if time should not admit of the line being passed round a tree, or the like, both line and 'buoy' are thrown into the water, and the animal goes wherever he chooses.

"The rest of the canoes are now all launched from off the raft, and chase is given to the poor brute, who, so soon as he comes to the surface to breathe, is saluted with a shower of light javelins. Again he descends, his track deeply crimsoned with gore. Presently—and perhaps at some little distance—he once more appears on the surface, when, as before, missiles of all kinds are hurled at his devoted head.

"When thus beset, the infuriated beast not unfrequently turns upon his assailants, and either with his formidable tusks, or with a blow from his enormous head, staves in or capsizes the canoes. At times, indeed, not satisfied with wreaking his vengeance on the craft, he will attack one or other of the crew, and with a single grasp of his horrid jaws either terribly mutilates the poor fellow, or, it may be, cuts his body fairly in two.

"The chase often lasts a considerable time. So long as the line and the harpoon hold, the animal cannot escape, because the 'buoy' always marks his whereabout. At length, from loss of blood or exhaustion, Behemoth succumbs to his pursuers."

The Hippopotamus is a gregarious animal, collecting in herds of twenty or thirty in number, and making the air resound with their resonant snorts. The snort of this creature is a most extraordinary sound, and one that is well calculated to disturb the nerves of sensitive persons, especially if heard unexpectedly. The animals at the Zoological Gardens make the very roof ring with the strange unearthly sounds which they emit. In their native state it is very difficult to ascertain even approximately the number of a herd, as the animals are continually diving and rising, and never appear simultaneously above the surface of the water.

The creature is generally a harmless one, and need not be much dreaded. Sometimes, however, it becomes angry if molested in its watery home, and will then make a violent attack upon the object that has excited its anger. One of these animals, whose calf had been speared on the previous day, made at the boat in which Dr. Livingstone was sitting, and drove her head against it with such force that she lifted the forepart of the boat completely out of the water, capsized one of the black oarsmen fairly into the river, and forced the whole crew to jump ashore.

Although in its native river the female Hippopotamus is a most kind and affectionate mother, the tame animal does not display such excellent qualities. The female Hippopotamus in the Jardin des Plantes in Paris has twice been a mother, and twice has killed her offspring. On the last occasion she seemed to have been seized with a sudden fit of anger, for the marks of her teeth were only too plain on the poor little beast when its dead body was discovered, and her tusks had penetrated into its lungs. On the first occasion she killed it from sheer awkwardness; and after carrying it about on her neck in the proper manner, she bruised it so severely in her clumsy efforts to teach her offspring the proper mode of getting out of the bath, that it never recovered from the hurts which it received.

The Hippopotamus has for years been extinct in Europe, but the fossil remains of the animal are found abundantly in the London clay, showing that in some remote age the Hippopotamus must have traversed the plains of England, and wallowed in its rivers. There is another species of Hippopotamus, which is smaller than that which has just been described, and is termed Hippopotamus Liberiensis. It is a native of Western Africa, and is remarkable for only having two incisors in the lower jaw.

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